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PROVISIONAL CATALOGUE OF THE FLORA OF KANSAS.

PART II. — GYMNOSPERMS AND MONOCOTYLS.

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(Read by title before the Academy at its annual meeting at Pittsburg, Kan., December 28, 1911,
and again read in abstract at the annual meeting at Topeka, December 23, 1912.)

INTRODUCTION.

THE first part of this catalogue, covering the mosses and ferns, was published in volume 24 of these transactions, page 273, issued in October, 1911. The present part (II) includes the gymnosperms and monocotyls. In order to fill out the classification, some gymnospermous trees and a few important other plants, not native to the state but grown under cultivation, are included.

Part III of this catalogue is expected to include the Choripetalæ and part IV the Sympetalæ. Part V (final) will embrace the simplest forms, Sub-kingdom I, covering the Protophyta, including bacteria, diatoms, etc., and the Thallophyta, including algæ, fungi, and lichens.

This time it is hoped to include in the catalogue all species of plants growing naturally in the state, small as well as great, together with nearly all of the cultivated trees, grasses and flowers. In order to include the lower orders of plant life, much study for many years has been given the microscopic vegetation of the state, a work which involves no small amount of persistent and well-directed labor. With three or more powerful and well-equipped compound microscopes constantly under our hands and in daily use, and a perfect familiarity with them brought about by years of experience, many when all are added together as students and teachers, it is to be hoped that our labors may produce many useful facts, and that our lists when presented will be well worthy of consideration.

An attempt, reasonably successful, is made in this work to bring botanical classification into harmony with itself and to give the various groups uniform endings to roots indicative of the locus of the term. With that end in view, as far as possible, the great primary divisions (subkingdoms) end in *ata* as *Archegoniata*, *Carpellata*; primary subdivisions (phyla) end in *phyta*, as *Anthophyta*; and classes as usual end in *inæ* or *iferæ*, as *Cycadineæ*,

Glumiferae; all based upon some characteristic that pervades the group. In the lower groups, subclasses end in *floræ*, as *Alismæ-floræ*, *Orchidifloræ*; orders in *ales*, as *Poales*, *Liliales*; family names end in *aceæ* as *Cyperaceæ*; subfamilies in *oideæ*, and tribe names in *eæ*, as *Cabomboideæ*, *Festuceæ*; all based upon some typical genus of the group. Thus, all group endings are harmonized as far as circumstances will admit.

Of monocotyls there are only two classes of plants: those with glumaceous or chloroplastic floral envelopes, and those with chromoplastic floral envelopes. The first, *Glumiferae*, is arranged to include not only the *Glumifloræ*, but also the *Spadicifloræ*, most of which have degenerate glumaceous floral envelopes, and very rarely only an incipient foliaceous perianth, as in the *Arales* and *Pandanales*. The other, *Petaliferae*, includes all those monocotyls with petals having colors other than green.

The authors have but a limited botanical library at their command, even though everything in the three great state libraries, including our own beloved Academy of Science library, is within easy reach and immediate access and use at any time. Nevertheless, in giving classical generic and specific names, the authors can only follow the lead of such botanical works as are within their reach, and disclaim absolute knowledge as to which name is the oldest and therefore the one to be used. In all doubtful cases the names familiar to botanists for the last fifty years are still followed. Uniformity in names the world over is certainly most desirable; and no one will rejoice more than the authors to see any system adopted that will prevent the constant changing of generic names, such as has been heretofore in operation.

As to English names, it seems quite as important that a correct English name be given as that a correct classical name be given. An effort is here made to give one good English name, and no more, to each species; not necessarily the oldest or original name, but the one, rather, that is the most universally given, or otherwise the one that seems most appropriate. Where no one seems most appropriate, several are given, any one of which is not used for any other plant unless it should be another of the same genus as: blue-grass and spear-grass for *Poa*; bluestem or beard-grass for *Andropogon*; meadow-grass or love-grass for *Eragrostis*; bulrush or club-rush for *Scirpus*. Certain names are preferred for certain genera, as pigeon-grass for *Chatochloa*, foxtail for *Alopecurus*, dropseed- or rush-grass for *Sporobolus*, panic-grass for *Panicum*.

A published English name for every plant is not found. Many of the native plants of Kansas are unknown and have no English names. Indian names are too uncertain and too poorly known among the Indians themselves for adoption. In such cases a name is usually given, based upon some characteristic suggestive of the plant; otherwise a liberal translation of the classical name. Among such names are bog-sedge for *Fuirena*, mild-onion for *Nothoscordum*, elfin-crown for *Androstephium*, here used for the first time. Whether these names will meet the approval of the people will depend upon many circumstances, none of which need be enumerated. The fashion of giving a classical generic name as a common English name is one highly to be commended. What is more beautiful or expressive than applying those names of a lifetime, such as *carex*, *calla*, *alisma*, *victoria*, *tritoma*, *yucca*, *trillium*, *smilax*, *iris*, *amaryllis*, *crocus*, *canna*, *orchis*, *geranium*, *cactus*, and a host of others, especially of well-known garden flowers? In such cases it would seem like a sacrilege to change the generic name for one ostensibly older. After a name has been in constant use all over the world for a long series of years, it being the only name known in all that time, and has become a part of our literature by having alkaloids, fixed and essential oils, dyestuffs, drugs, and other nouns and adjectives derived from it and based upon it, it should not, except for the very best of reasons, be removed from the language or changed for another that some library searcher has discovered had been previously applied to it, perhaps by some unreliable author in some obscure publication, and rejected at the time for the best of reasons. The work of an unscientific, unskillful and unreliable author is unworthy and does not deserve perpetuation.

The authors are not in sympathy with systematists who give a new generic name to every plant having but slight differences of carpellate structure, and wish to disparage to the fullest extent the frequent practice of giving a new specific name to every new mutation that gives promise of permanency and being true to seed, thus answering all of their requirements of a new species. It were better by far to revise the taxonomic criteria for genera and species, and to consider such mutations in the light of horticultural variations of a species, even though of wild or uncultivated plants. Conditions and environment have much to do with the growth and appearance of plants. So the fewer the new species and genera the better.

To Prof. John H. Schaffner, professor of botany at the Ohio State University, we are sincerely indebted for much valuable as-

sistance and advice in the preparation of this catalogue. His advice in arrangement, classification, and nomenclature has been constantly sought by us and freely given by him; yet, seldom has his advice been closely followed. Nevertheless, his counsel has necessarily been of great service.

The foundation for this catalogue is Smyth's Checklist of the Plants of Kansas, published in 1892 (which was Smyth's third list, previous ones having been published in the transactions of the Graywood Botany Club and the Bulletin of the Washburn Laboratory of Natural History), since which time much has been learned of the botany of the state; yet the classification of that modest work has been departed from mainly in reversing the general arrangement in keeping with present-day methods and the introduction of some harmonic terms in classification and in description. A fourth catalogue, on a different plan, entitled "Plants and Flowers of Kansas," by the senior author, was published in 1900, by Crane & Co., of Topeka, in their "Twentieth Century Classics," thus making the present catalogue Smyth's fifth list of the plants of Kansas.

Quasi-new terms (*acicles* and *laminodia*) are here introduced for the leaves of some gymnosperms and monocotyls, which differ fundamentally and intrinsically from the ordinary leaves of dicotyls as much as do bracts, scales, sepals, phyllodia, and other forms of leaves to which are applied special terms. It is expected that these terms will commend themselves to botanists in general, and will, if worthy, meet their approval.

In the following pages herbaria in which specimens of the plants are contained are indicated by initials as far as known. (A) represents the herbarium of the Kansas Agricultural College, which is very full as to representatives of the Kansas flora, and which has been frequently consulted; (S) is the State Herbarium, in charge of the principal author and made in toto by him; it also stands for the private herbaria of the authors, as well as the herbarium of Professor Schaffner, which is richly supplied with Kansas plants, and is a part of the foundation of this catalogue; (U) is the herbarium of the Kansas State University, which the principal author has consulted, and of which the authors have a partial list of the plants. A few names are included on the authority of Mr. F. V. Coville, botanist of the Department of Agriculture at Washington.

That there should be errors in the present catalogue is unavoidable and rather to be expected. All such discovered in season will

be eliminated in the permanent catalogue, publication of which will necessarily be some years off yet. Correspondents will be thanked for calling attention to any veiled errors; obvious ones are evident enough and will need no pointing out.

All persons interested in the flora of Kansas are invited to correspond with the authors. Let us know what you have learned of the flora of your region, whether we have listed it or not, and send us some specimens, if possible. Wake up and do something! Here is a good Kansas book; it is yours.

Herewith is presented a scheme of classification and arrangement that is adapted to the accompanying part of the catalogue of the Flora of Kansas.

SCHEME OF CLASSIFICATION AND ARRANGEMENT.

PART II.

(As adapted to the flora of Kansas.)

Subkingdom *III.* CARPELLATA. Carpellate Seen-bearing Plants.

Superphylum AAA. GYMNOSPERMÆ. Naked-seed Carpellates.

*Phylum *III. CYCADOPHYTA. Cycadeous Gymnosperms.*

Class VI. CYCADINEÆ. Endogenous Palm-like Cycadophytes.*

ORDER XI. CYCADALES. THE CYCADS.

Family 26. CYCADACEÆ. Cycad family.

Genus 88. *Cycas*. Cycad.

Class VII. GINKGOINEÆ. Exogenous Fern-like Cycadophytes.*

ORDER XII. GINKGOALES. THE MAIDENHAIR TREES.

Family 27. GINKGOACEÆ. Maidenhair-tree family.

Genus 90. *Ginkgo*. Ginkgo; Maidenhair tree.

*Phylum *IV. STROBILOPHYTA. Cone-bearing Gymnosperms.*

Class VIII. CONIFERÆ. Exogenous Strobilophytes.*

ORDER XIII. TAXALES. The yews.

Family 28. TAXACEÆ. Yew family,

Genus 91. *Taxus*. Yew.

ORDER XIV. CUPRESSALES. THE CYPRESSES AND CEDARS.

Family 29. JUNIPERACEÆ. Juniper family.

Genus 92. *Juniperus*. Juniper.

Family 30. CUPRESSACEÆ. Cypress family.

Genus 93. *Thuja*. Arbor-vitæ.

94. *Chamæcyparis*. Ground cypress.

95. *Cupressus*. Cypress.

96. *Taxodium*. Bald cypress.

97. *Retinospora*. Oriental cypress.

98. *Cryptomeria*. Japan cedar.

ORDER XV. PINALES. THE PINES AND THEIR ALLIES.

Family 31. PINACEÆ. Pine family.

Genus 99. *Araucaria*. Norfolk pine.

100. *Abies*. Fir.

101. *Tsuga*. Hemlock.

102. *Picea*. Spruce.

103. *Pinus*. Pine.

Superphylum BBB. ANGIOSPERMÆ. Hidden-seed Carpellates.

Phylum *V. ANTHOPHYTA. Flowering Angiosperms.

SUBPHYLUM DD. MONOCOTYLEDONES. SINGLE-SEED-LEAF ANTHOPHYTES.

Class IX.* GLUMIFERÆ. Monocotyls with Glumaceous Perianth.

Subclass A. GLUMIFLORÆ. Glume-flowered Monocotyls.

ORDER XVI. POALES. THE GRASSES AND CANES.

Family 32. PANICACEÆ. Panic-grass family.

Tribe a. Maydæ. Maize tribe.

Genus 104. *Euchlæna*. Teosinte.

105. *Zea*. Indian corn.

106. *Tripsacum*. Gama grass.

Tribe b. Andropogonæ. Bluestem tribe.

Genus 107. *Coix*. Tear-grass.

108. *Eulalia*. Eulalia.

109. *Imperata*. Blady-grass.

110. *Erianthus*. Plume-grass.

111. *Andropogon*. Beard-grass.

112. *Sorghastrum*. Indian grass.

113. *Sorghum*. Sugar cane.

Tribe c. Paniceæ. Panic-grass tribe.

Genus 114. *Paspalum*. Water-grass.

115. *Eriochloa*. Wool-grass.

116. *Syntherisma*. Crab-grass.

117. *Brachiaria*. Arm-grass.

118. *Leptoloma*. Witch-grass.

119. *Panicum*. Panic-grass.

120. *Echinochloa*. Cockspur-grass.

121. *Chætochloa*. Pigeon-grass.

122. *Cenchrus*. Bur-grass.

123. *Penicillaria*. Pearl millet.

Tribe d. Oryzæ. Rice-grass tribe.

Genus 124. *Zizania*. Wild rice.

125. *Homalocenchrus*. Cut-grass.

Family 33. POACEÆ. Meadow-grass family.

Tribe e. Phalaridæ. Canary-grass tribe.

Genus 126. *Phalaris*. Canary grass.

127. *Anthoxanthum*. Vernal grass.

128. *Oryzopsis*. Mountain rice.

Tribe f. Agrostidæ. Reed-grass tribe.

Genus 129. *Stipa*. Weather-grass.

130. *Aristida*. Poverty-grass.

131. *Muhlenbergia*. Satin-grass.

132. *Phleum*. Timothy.

133. *Alopecurus*. Foxtail-grass.

134. *Sporobolus*. Dropseed-grass.

135. *Cinna*. Wood-reed-grass.

136. *Agrostis*. Bent-grass; Redtop.

137. *Calamagrostis*. Bluejoint-reed-grass.

138. *Calamovilfa*. Sand-reed-grass.

Tribe g. Avenæ. Oat-grass tribe.

Genus 139. *Holcus*. Velvet-grass.

140. *Sphenopholis*. Prairie-grass.

141. *Koeleria*. Prairie-June-grass.

142. *Trisetum*. Three-bristle oat-grass.

143. *Avena*. Oats.

144. *Arrhenatherum*. Oat-grass.

145. *Danthonia*. Wild-oat-grass.

ORDER XVI. Family 33.—*continued*.

Tribe *h*. Chlorideæ. Crowfoot-grass tribe.

- Genus 146. *Cynodon*. Bermuda grass.
- 147. *Spartina*. Cord-grass.
- 148. *Chloris*. Windmill-grass.
- 149. *Gymnopogon*. Naked-beard-grass.
- 150. *Schedonnardus*. Tumble-grass.
- 151. *Bouteloua*. Grama grass.
- 152. *Beckmannia*. Slough grass.
- 153. *Eleusine*. Goosefoot-grass.
- 154. *Leptochloa*. Slender-grass.
- 155. *Buchloe*. Buffalo-grass.

Tribe *i*. Festuceæ. Meadow-grass tribe.

- Genus 156. *Pappophorum*. Brush-grass.
- 157. *Gynierium*. Pampas grass.
- 158. *Arundo*. Reed-grass.
- 159. *Phragmites*. Reed.
- 160. *Munroa*. Thistle-grass.
- 161. *Triodia*. Purpletop-grass.
- 162. *Redfieldia*. Blowout-grass.
- 163. *Diplachne*. Feather-grass.
- 164. *Eragrostis*. Meadow-grass.
- 165. *Melica*. Melic-grass.
- 166. *Diarrhena*. Twin-grass.
- 167. *Distichlis*. Alkali-grass.
- 168. *Uniola*. Spike-grass.
- 169. *Briza*. Quaking-grass.
- 170. *Dactylis*. Orchard-grass.
- 171. *Cynosurus*. Dog-tail grass.
- 172. *Poa*. Blue-grass; spear-grass.
- 173. *Glyceria*. Manna-grass.
- 174. *Puccinellia*. Goose-grass.
- 175. *Festuca*. Fescue-grass.
- 176. *Bromus*. Brome-grass.

Tribe *k*. Hordeæ. Rye-grass tribe.

- Genus 177. *Lolium*. Darnel; ray-grass.
- 178. *Agropyron*. Wheat-grass.
- 179. *Triticum*. Wheat; emmer; spelt.
- 180. *Secale*. Rye.
- 181. *Hordeum*. Barley.
- 182. *Elymus*. Lyme-grass; wild-rye.
- 183. *Sitanion*. Bristle-grass.
- 184. *Hystrix*. Bottle-brush-grass.

Family 34. BAMBUSACEÆ. Bamboo family.

- Genus 185. *Arundinaria*. Cane.
- 186. *Bambusa*. Bamboo.

ORDER XVII. CYPERALES. THE SEDGES.

Family 35. CYPERACEÆ. Sedge family.

- Genus 187. *Cyperus*. Sedge; cyperus.
- 188. *Kyllinga*. Bur-sedge.
- 189. *Dulichium*. Reed-sedge.
- 190. *Eleocharis*. Spike-rush.
- 191. *Fimbristylis*. Fringe-rush.
- 192. *Scirpus*. Club-rush; bulrush.
- 193. *Eriophorum*. Wool-rush.
- 194. *Fuirena*. Bog-rush.
- 194. *Hemicarpha*. Bog-rush.
- 195. *Rynchospora*. Beak-rush; beak-sedge.
- 196. *Cladium*. Twig-rush.

Family 36. CARICACEÆ. Carex family.

- Genus 197. *Scleria*. Nut-rush; nut-sedge.
- 198. *Carex*. Carex; hop-sedge, etc.

ORDER XVIII. JUNCALES. THE TRUE RUSHES.

Family 37. JUNCACEÆ. Rush family.

Genus 199. Juncus. Rush.

200. Luzula. Wood-rush.

Subclass B. SPADICIFLORÆ. Spadix-flowered monocotyls.

ORDER XIX. ARALES. THE ARADS.

Family 38. LEMNACEÆ. Duckweed family.

Genus 201. Wolffia. Frog-spit.

202. Lemna. Duckweed.

203. Spirodela. Great duckweed.

Family 39. ARACEÆ. Arum family.

Genus 204. Acorus. Calamus.

295. Arisaema. Indian turnip.

206. Amorphophallus. Giant arum.

207. Caladium. Caladium.

208. Calla. Calla.

ORDER XX. PANDANALES. THE CATTAIL REEDS.

Family 40. TYPHACEÆ. Cattail family.

Genus 209. Typha. Cattail (flag).

Family 41. SPARGANIACEÆ. Bur-reed family.

Genus 210. Sparganium. Bur-reed.

Family 42. PANDANACEÆ. Screw-pine family.

Genus 211. Pandanus. Pandanus.

ORDER XXb. PALMALES. THE PALMS.

Family 42b. PHENICACEÆ. Date-palm family.

Genus 212. Phoenix. Date palm.

Family 42c. COCACEÆ. Coconut family.

Genus 213. Cocos. Coconut palm.

214. Areca. Betelnut palm.

215. Kentia. Feather palm.

Family 42d. SABATACEÆ. Fan-palm family.

Genus 216. Livistona. Bourbon palm.

ORDER XXI. NAIADALES. THE PONDWEEDS.

Family 43. ZANNICHELLIACEÆ. Pondweed family.

Genus 217. Potamogeton. Pondweed.

218. Ruppia. Ditch-grass.

219. Zannichellia. Horned pondweed.

Family 44. NAIADACEÆ. Water-nymph family.

Genus 220. Naias. Water-nymph.

Class X.* PETALIFERÆ. Monocotyls with Showy Perianth.

Subclass C. ALISMAFLORÆ. Alisma-flowered Monocotyls.

ORDER XXII. HYDRALES. THE WATERWORTS.

Family 45. VALLISNERIACEÆ. Tape-grass family.

Genus 221. Philotria. Ditch-moss.

222. Vallisneria. Tape-grass.

223. Limnobium. Frog's-bit.

ORDER XXIII. ALISMALES. THE ALISMADS.

Family 46. SCHEUCHZERIACEÆ. Arrow-grass family.

Genus 224. Triglochin. Arrow-grass.

225. Scheuchzeria. Arrow-grass.

Family 47. ALISMACEÆ. Arrow-head family.

Genus 226. Alisma. Alisma; round-head.

227. Helianthium. Spear-head.

228. Echinodorus. Bur-head.

229. Lophotocarpus. Lance-head.

230. Sagittaria. Arrow-head.

ORDER XXIV. COMMELINALES. THE DAYFLOWERS.

Family 48. COMMELINACEÆ. Spiderwort family.

Genus 231. Tradescantia. Spiderwort.

232. Commelina. Dayflower.

ORDER XXIV.—*continued*.

Family 49. PONTEDERIACEÆ. Pickerel-weed family.

- Genus 233. *Heteranthera*. Mud-plantain.
- 234. *Piaropus*. Water-hyacinth.
- 235. *Pontederia*. Pickerel-weed.

ORDER XXV. NYMPHÆALES. THE WATER-LILIES.

Family 50. NYMPHÆACEÆ. Water-lily family.

(a) Cabomboideæ. Water-shield subfamily.

- Genus 236. *Cabomba*. Water-shield.
- 237. *Brasenia*. Water-target.

(b) Nymphaeoidæ. Pond-lily subfamily.

- Genus 238. *Nymphaea*. Pond-lily.
- 239. *Castalia*. Water-lily.
- 240. *Victoria*. Victoria.

(c) Nelumboideæ. Water-lotus subfamily.

- Genus 241. *Nelumbo*. Water-lotus.

Subclass D. LILIIFLORÆ. Lily-flowered Monocotyls.

ORDER XXVI. LILIALES. THE LILIADS.

Family 51. MELANTHACEÆ. Bunch-flower family.

- Genus 242. *Colchicum*. Saffron; meadow.
- 243. *Chamaelirium*. Blazing-star.
- 244. *Zygadenus*. Zygadene.
- 245. *Melanthium*. Melanth.
- 246. *Uvularia*. Bellwort.

Family 52. LILIACEÆ. Lily family.

- Genus 247. *Hemerocallis*. Day-lily.
- 247b. *Funkia*. Day-lily.
- 248. *Agapanthus*. Love-flower.
- 249. *Allium*. Wild-onion.
- 250. *Nothoscordum*. Mild-onion.
- 251. *Androstephium*. Elfin-crown.
- 252. *Lilium*. Lily; wood-lily.
- 253. *Fritillaria*. Fritillary.
- 254. *Erythronium*. Adder-tongue.
- 255. *Tulipa*. Tulip.
- 256. *Camassia*. Wild-hyacinth.
- 257. *Hyacinthus*. Hyacinth.
- 258. *Ornithogalum*. Star-of-Bethlehem.
- 259. *Muscari*. Grape-hyacinth.
- 260. *Tritoma*. Tritoma; red-hot-poker.
- 261. *Sansevieria*. Sansevieria.
- 262. *Dracæna*. Dragon-tree.
- 263. *Yucca*. Yucca; Spanish bayonet.
- 264. *Asparagus*. Asparagus.
- 265. *Smilacina*. Smilacina.
- 266. *Streptopus*. Twistfoot.
- 267. *Polygonatum*. Solomon-seal.
- 268. *Convallaria*. Lily-of-the-valley.
- 269. *Trillium*. Trillium.

Family 53. AMARYLLIDACEÆ. Amaryllis family.

- Genus 270. *Hymenocallis*. Hymenocallis.
- 271. *Narcissus*. Narcissus, daffodil, etc.
- 272. *Zephyranthes*. Atamasco lily.
- 273. *Amaryllis*. Amaryllis, Jacobæa lily.
- 274. *Leucojum*. Snowflake.
- 275. *Cooperia*. Prairie rain-lily.
- 276. *Hypoxis*. Star-grass.
- 277. *Galanthus*. Snowdrop.
- 278. *Polianthes*. Tuberose.
- 279. *Agave*. Century-plant.

ORDER XXVII. SMILACALES. THE GREENBRIERS AND YAMS.

Family 54. SMILACACEÆ. Greenbrier family.

Genus 280. Smilax. Greenbrier; smilax.

Family 55. DIOSCOREACEÆ. Yam family.

Genus 281. Dioscorea. Yam-root; cinnamon-vine.

Subclass E. ORCHIDIFLORÆ. Orchis-flowered monocotyls.

ORDER XXVIII. IRIDALES. THE IRIDS.

Family 56. IRIDACEÆ. Iris family

Genus 282. Iris. Iris, blue-flag, etc.

283. Nemastylis. Twin-star-flower.

284. Belamcanda. Blackberry lily.

285. Sisyrinchium. Blue-eyed-grass.

286. Tigridia. Tiger-flower.

287. Gladiolus. Gladiolus; sword-flag.

288. Crocus. Crocus.

ORDER XXIX. SCITAMINALES. THE DAINTIES.

Family 57. MUSACEÆ. Banana family.

Genus 289. Musa. Banana.

Family 58. MARANTACEÆ. Arrowroot family.

Genus 290. Maranta. Arrowroot.

291. Canna. Canna.

ORDER XXX. ORCHIDALES. THE ORCHIDS.

Family 59. CYPRIPEDIACEÆ. Lady-slipper family.

Genus 292. Cypripedium. Lady-slipper.

Family 60. ORCHIDACEÆ. Orchis family.

Genus 293. Pogonia. Pogonia.

294. Triphora. Beard-lip.

295. Spiranthes. Lady-tresses.

296. Blephariglottis. Fringed-orchis.

297. Habenaria. Rein-orchis.

298. Oncidium. Tiger-orchis.

299. Cattleya. Cattleya.

300. Orchis. Orchis.

HARMONIES OF THE NOMENCLATURE.

PARTS I AND II. Liverworts to Orchids.

SUBKINGDOMS.		FAMILIES.	
II	Archegoniata.	1.	Ricciaceæ.
III	Carpellata.	2.	Marchantiaceæ.
SUPERPHYLA.		3.	Anthocerotaceæ.
AAA.	Gymnospermæ.	4.	Jungermanniaceæ.
BBB.	Angiospermæ.	5.	Micromitriaceæ.
PHYLA.		6.	Phascaceæ.
*I.	Bryophyta.	7.	Archidiaceæ.
*II.	Pteridophyta.	8.	Dicranaceæ.
*III.	Cycadophyta.	9.	Pottiaceæ.
*IV.	Strobilophyta.	10.	Grimmiaceæ.
*V.	Anthophyta.	11.	Funariaceæ.
SUBPHYLA.		12.	Bryaceæ.
AA.	Stereocaulones.	13.	Polytrichaceæ.
BB.	Arthrocaulones.	14.	Fontinalaceæ.
CC.	Lepidocaulones.	15.	Neckeraceæ.
DD.	Monocotyledones.	16.	Fabroniaceæ.
EE.	Dicotyledones.	17.	Leskeaceæ.
CLASSES.		18.	Hypnaceæ.
I*	Marchantineæ.	19.	Polypodiaceæ.
II*	Bryineæ.	20.	Ophioglossaceæ.
III*	Pteridineæ.	21.	Salviniaceæ.
IV*	Equisetineæ.	22.	Marsileaceæ.
V*	Lycopodineæ.	23.	Isotaceæ.
VI*	Cycadineæ.	24.	Equisetaceæ.
VII*	Ginkgoineæ.	25.	Selaginellaceæ.
VIII*	Conifereæ.	26.	Cycadaceæ.
IX*	Glumifereæ.	27.	Ginkgoaceæ.
X*	Petalifereæ.	28.	Taxaceæ.
SUBCLASSES.		29.	Juniperaceæ.
A.	Glumifloræ.	30.	Cupressaceæ.
B.	Spadicifloræ.	31.	Pinaceæ.
C.	Alismæfloræ.	32.	Panicaceæ.
D.	Liliifloræ.	33.	Poaceæ.
E.	Orchidifloræ.	34.	Bambusaceæ.
ORDERS.		35.	Cyperaceæ.
I.	Marchantiales.	36.	Caricaceæ.
II.	Jungermanniales.	37.	Juncaceæ.
III.	Phascales.	38.	Lemnaceæ.
IV.	Bryales.	39.	Araceæ.
V.	Pteridales.	40.	Typhaceæ.
VI.	Ophioglossales.	41.	Sparganiaceæ.
VII.	Hydropteridales.	42.	Pandanaceæ.
VIII.	Isotales.	42b.	Pheniceæ.
IX.	Equisetales.	42c.	Cocaceæ.
X.	Selaginellales.	43.	Zannichelliaceæ.
XI.	Cycadales.	44.	Naiadaceæ.
XII.	Ginkgoales.	45.	Vallisneriaceæ.
XIII.	Taxales.	46.	Scheuchzeriaceæ.
XIV.	Cupressales.	47.	Alismaceæ.
XV.	Pinales.	48.	Commelinaceæ.
XVI.	Poales.	49.	Pontederiaceæ.
XVII.	Cyperales.	50.	Nymphaeaceæ.
XVIII.	Juncuales.	51.	Melanthaceæ.
XIX.	Arales.	52.	Liliaceæ.
XX.	Pandanales.	53.	Smilacaceæ.
XXb.	Palmales.	54.	Dioscoreaceæ.
XXI.	Naiadales.	55.	Amarylilidaceæ.
XXII.	Hydrales.	56.	Iridaceæ.
XXIII.	Alismales.	57.	Musaceæ.
XXIV.	Commelinales.	58.	Marantaceæ.
XXV.	Nymphaeales.	59.	Cypripediaceæ.
XXVI.	Liliales.	60.	Orchidaceæ.
XXVII.	Smilacales.	TRIBES.	
XXVIII.	Iridales.	Fam. 32, a.	Maydeæ.
XXIX.	Sciaminales.	b.	Andropogoneæ.
XXX.	Orchidales.	c.	Panicææ.
		d.	Oryzeæ.
		Fam. 33, e.	Phalaridææ.
		f.	Agrostidææ.
		g.	Avenææ.
		h.	Chloridææ.
		i.	Festuceæ.
		k.	Hordeææ.

Subkingdom *III.* CARPELLATA. Carpellates.**Carpellate Seed-bearing Plants.**

Plants with flowers containing anthers or ovules, or both. Anthers carrying one, two or four androsporangia, within which pollen (androspores) are perfected, are usually located at the summit of stamens (androphyls), from which, when mature, the pollen, each spore carrying one or more antherozoids or sperms, escapes through a slit, a pore, a trap-door, a wicket, a window, or other specialized form of dehiscence. Spores develop a pollen-tube.

Ovules (gynosporangia) are situated at the base of a specialized leaf, called a carpophyl or carpel, and are either naked always or for a time on the inner surface of a leaf, or are fully enclosed within a special cavity of the folded leaf.

Fecundation is effected by pollen (minute androspores bearing motile or nonmotile antherozoids) falling upon an ovule (gynosporangium) within a special chamber on or within a carpophyl (fruit-bearing leaf), germinating there, and passing through the micropyle (little gate) by means of its pollen-tube, which has grown for that special purpose, encounters an egg-cell (gynospore) with which one of the antherozoids fuses, thus producing an embryo. (As to what becomes of the other antherozo-id see Phylum *V, Anthophyta, *post.*)

Sporophyte (nonsexual plant) conspicuous, comparatively long-lived, firmly rooted in the earth, normally erect, and spreading its leaves in the air (or water). Bearing flowers, which is preparatory, is a condition precedent to bearing fruit, which is final.

Gametophyte (sexual plant) very minute and hidden, usually microscopic, totally parasitic on the sporophyte, and retained within the developed ovule until mature; then, having all the food materials stored up about it that are necessary for nursing the young embryo until it has become established as an independent existence by casting its roots into the soil and depending upon its own ability and surrounding resources, the future plant is organized into an independent and self-supporting creation, is separated from the parent plant and undergoes what is called a resting stage, but which is in reality a formative period, during which all the cells are very minutely divided and subdivided, assembled, and organized as required to constitute an orderly arrangement of the interior, in which the entire vegetative portion of the future-existing plant for one year is fully organized in miniature, *in embryo*, awaiting only development. This is the SEED, which, when the necessary time for complete organization has elapsed, and the proper and requisite conditions are encountered, germinates and grows into a plant like the parents. The reproductive portion of the plant is not organized in the seed; but is organized toward completion of development of the vegetative portion.

Thus, every carpellate plant in existence passes through four important periods or stages in its life, namely:

First. A *generative stage*, during which the nucleus of a gynospore within an ovule on or in a carpophyl undergoes definite division, and, under certain fixed conditions, becomes impregnated by fusion with it of a gen-

erative sperm-cell which comes to it within a pollen-tube through the micropyle, or sacred door (through which nothing else enters), along a specially prepared path, from an androphyl in a staminate or a perfect flower of its own kind; and thus a new being is created. This is the EMBRYOTIC PERIOD; and is the most important of all, though least (microscopic, in fact), and is least understood as to its inmost workings.

Second. A *formative stage*, during which all the parts of the future plant are created, assembled, and fully organized in embryo. This is the SEED-FORMING PERIOD in carpellates; it corresponds to the oösporal stage in archegoniates and with the egg stage in all animate creation. In all short-lived carpellates, such as annuals and biennials (or winter annuals), creation is determinate. All parts of the plant, except the reproductive bodies, are completely created and fully organized before ever the plant leaves the wall of the seed. In trees and perennials of temperate and cold regions growth is determinate. One complete year's growth is organized in the seed; afterward, each year's growth is organized in the bud, usually during the latter part of the year preceding development. Flowers and fruit are organized at the same time.

Third. A *development stage*, during which the plant, having become established as an independent existence, grows and develops to its full stature, so far as circumstances will permit. This is the PERIOD OF GROWTH; and is the most evident stage in all carpellates and in nearly all plants. It corresponds with the sporophytic stage in archegoniates, with the larval stage in insects, and with the young period in all animal life. Even in carpellates the plant during this period is called *sporophyte*. Toward its close the reproductive bodies are created, organized, and developed, and the gametophytes organized.

Fourth. An *executive stage*, during which the plant performs all the functions for which it was created: blossoms, bears fruit, and does its part toward the reproduction of other plants of its kind. This is the FRUIT-BEARING PERIOD, and corresponds to the gametophytic stage in archegoniates and to the adult period in all creation. While in archegoniates the oöspore when formed is separated from the sporophyte and develops as a separate existence, in carpellates it is not so. In this subkingdom the oöspore is retained within the body of the ovule; here the prothallia are formed containing the true sexual organs, the archegonia and antheridia, and here the gametophyte is fully developed, always within the wall of the seed which carries it. This whole operation is hidden within the wall of the seed; and so also in anthophytes is the seed hidden within the walls of the ovulary. This last period covers completely and includes the embryotic stage and the constructive portion of the seed stage of a future generation.

There are three main phyla of this subkingdom: (i) Palm-like and fern-like plants, in which the ovules are always uncovered, as in *cycadophytes*; (ii) plants without perianth, in which the ovules are at first uncovered, and later are partially covered by a scale, as in *strobilophytes*; (iii) plants with conspicuous perianth, in which the ovules are always completely concealed, as in *anthophytes*.

Superphylum AAA. GYMNOSPERMÆ. Gymnosperms.

NAKED-SEED CARPELLATES.

Exogenous, rarely endogenous, trees with unisexual flowers destitute of a perianth. Ovules (gynosporangia) naked, on the summit of a carpophyl or in the axil of a scaly carpophyl which may later cover the seed. Sperms motile or nonmotile, ciliate or nonciliate. Cotyledons two or more.

Phylum *III. CYCADOPHYTA. Cycadophytes.

Cycadaceous Gymnosperms.

Carpels (carpophyls) very primitive or reduced, often very minute, scarcely more than a mere disk on the end of a pinna or branchlet, or in the axils of scales of large and conspicuous carpophores. Ovules always naked. Pollen (androspores) subglobular, obscurely tetrahedral. Antherozoids (sperms) coiled, multiciliate, motile.

Sporophytes endogenous or exogenous, erect, ligneous, long-lived.

Gametophytes minute, developed entirely within naked seeds by the large, leafy-stemmed, firmly rooted sporophytes.

CLASS VI.* CYCADINEÆ. CYCADS.

Endogenous Palm-like Cycadophytes.

Plants dioecious, the staminate and carpellate flowers on separate plants. Androphores (anther-bearers) very large, persistent, quadrately or rhomboidally obconic. Androphyls (stamens) numerous. Anthers (androsporangia, properly androsporangiphores) in threes, radiating from the summit of the short filaments. Sporangia two (bisporangiate), dehiscing by a longitudinal slit down the middle of the face of each spore. Pollen angular, somewhat tetrahedral, with one spherical face and three less curved ones. Pollination anemophilous. Carpophores very large, flat, pinnate, destitute of chlorophyl, and densely covered with pale, fawn-colored hair; only the lower pinnæ fertile. Ovules (gynosporangia) naked, on the ends of the lower shortened pinnæ of the carpophore. Seeds conspicuous, nut-like (with a hard shell), edible.

Species of this transitional class are very few in all the world; once in the earth's history they were very abundant. None are native in Kansas; probably few have lived here since the Cretaceous period; though once they were very abundant along the lower Cretaceous seashore from Sun City to Englewood. But exotic species of cycads and of maidenhair trees are cultivated in Kansas to a slight extent because of their rare beauty.

ORDER XI. CYCADALES. THE CYCADS.

Palm-like endogenous plants, with a short (one meter or less), thick, unbranched, ligneous trunk, bearing many large spirally arranged pinnate leaves. Flowers characterized by the absence of enveloping parts. Seeds borne on the ends of pinnæ of a large and conspicuous carpophore.

Family 26. CYCADACEÆ. Cycad Family.

Short, stout stems, bearing at the summit a conspicuous crown of circinate pinnate leaves, lasting for several years, each subtended by a small sharp-pointed hyaline scale. The leaves, on dropping, leave noticeable

leaf scars. Remarkable for their rich, palm-like appearance and for their being a remnant of a class of plants that lived in great abundance and vigor in Mesozoic times.

Species 166. *Cycas revoluta* Thunberg. Cycad. A small tree (?), seldom more than a meter high, usually much less, with a diameter of 20 to 30 centimeters. Raised in tubs, mainly in greenhouses, often in private houses.

CLASS VII.* GINKGOINEÆ. GINKGOS.

Exogenous Fern-like Gymnosperms.

Trees monoecious, with androspores and gynospores on the same tree. Androphyls numerous, on small, ament-like, semipendulous racemes (androphores) arising from a leaf-fascicle. Androsporangia (anthers) two, each with a single sporangium attached by one end, pendulous, and dehiscing by a longitudinal slit. Androspores (pollen) tetrahedrally subspherical. Pollination anemophilous. Carpophores compound, subpaniculate, not conspicuous, with about two naked ovules (gynosporangia) on a carpophyl at the end of each branchlet; ovules provided with an embryo-sac (gynospore); only one ovule usually fertilizes and develops, making a small edible nut.

ORDER XII. GINKGOALES. THE MAIDENHAIR TREES.

Finely branching exogenous trees, with fascicled fern-like foliage. Trees bear naked seeds on carpophyls at the ends of a compound carpophore.

Family 27. GINKGOACEÆ. Maidenhair-tree Family.

Stately trees, with numerous branches and branchlets, and with leaves in scaly fascicles. Leaves annual (deciduous), petiolate, with the distal portion gradually expanded into a fan-shaped lamina with dichotomous radiating venation. Perifascicular scales opposite, obtuse, imbricate, in four ranks. Fruit of the form and size of plums, with a hard pericarp, on the tips of compound peduncles (carpophyls).

Species 167. *Ginkgo biloba* Linnæus. (*Salisburia adiantifolia* J. E. Smith.) Ginkgo; Maidenhair-tree. Occasional in cultivation, and grows readily where the soil is not too thin and dry and the sunshine too intense. A tree of Japan.

Phylum *IV. STROBILOPHYTA. Strobilophytes.

Cone-bearing Gymnosperms.

Carpels sometimes very minute; never form an ovulory. Ovules (gynosporangia) in the axils of prominent scales upon a conspicuous strobile or cone. Stigmas none. Anthers (androsporangia) spirally arranged on a small fugacious ament (androphore), on the under side of each anther-scale (androphyl), each anther carrying a single sporangium.

In fecundation pollen (minute androspores carrying unciliated nonmotile antherozoids or sperms) from an anther on a staminate ament falls directly upon an uncovered ovule on a carpellate ament; the antherozoids enter the micropyle (sacred entrance) of the ovule and fuse with the ovum within; when shortly the carpellate ament becomes a cone or fuses into a small berry. Pollination dependent upon the wind (anemophilous). The resulting seed becomes covered and protected by the scale. Such a seed differs from an oöspore (part I, page 5) mainly in being more elaborate in structure, as arising from a fully developed archegonium. Purpose is the same—perpetuation of species; methods differ.

CLASS VIII.* CONIFERÆ. CONE-BEARERS.

Exogenous Strobilophytes.

Sporophytes ligneous, exogenous, with distinct wood covered with bark, and with fascicled acicular foliage, somewhat equivalent to the leaf-petioles of Ginkgoineæ without the laminæ. Growth of new wood and bark by annual periods, in concentric cylindrical layers, continuously on the outside of the wood already formed, and on the inside of the bark. Tracheids (sap ducts) in the wood in strict radial vertical ranks, two to five ranks or thereabout between two contiguous radial plates. Radial plates in strobilophytes one cell thick, rarely more, and with a vertical breadth of from three to about sixteen cells, equivalent to a thickness of from 15 to 40 microns (thousandths of a millimeter) and to a vertical breadth of from one-twentieth to one-half a millimeter. Androspores on deciduous aments (androphores); gynospores on the upper side of scales (carpophyls) upon a perennial cone (carpophore).

Gametophytes minute, developed wholly within the seeds.

ORDER XIII. TAXALES. THE YEWS.

Slightly resinous trees or shrubs, with diœcious axillary flowers. Androphores as scaly deciduous aments; scales few and small, each covering a small androphyl which bears at its summit five to nine little androsporangia (unisporangiate anthers), these pendent, attached by one end, and dehiscing in a peculiar manner, opening first at the lower ends a little, then gradually tearing upward till the entire androphyl looks like a tiny umbrella, holding the spores till a stiff breeze comes along and carries the ripe ones away. Carpophores solitary, erect, cone-shaped, at first terminal, later becoming axillary by development of a secondary terminal branch bud; ovule (gynosporangium) single, orthotropous, inclosed in integument; seed develops a red, fleshy aril, which is edible, though the seed is not.

Family 28. TAXACEÆ. Yew Family.

Evergreen trees, with scattered linear leaves (needles), occasionally forming two imperfect ranks by twisting of the leaves to a horizontal position upon a twig nearly or quite horizontal. Flowers diœcious, axillary, solitary, naked, or partially covered by opposite overlapping scales. Staminate flowers on a deciduous ament under the branch, the sporangia pendent. Carpellate flower (carpophore) a solitary straight ovule above the branch, in fruit becoming a bony-coated seed partially surrounded by a fleshy pericarp (the aril). Embryo in farinaceous albumen; cotyledons two.

168. *Taxus canadensis* Marsh. American Yew. Occasionally planted in choicest parks.

169. *Taxus baccata* Linn. European Yew. Occasional in cemeteries.

170. *Taxus hibernica* Hooker. Irish Yew. A choice tree for cemeteries, but not well adapted to this climate.

ORDER XIV. CUPRESSALES. THE CYPRESSES AND CEDARS.

Slightly resinous evergreen trees or shrubs, with unsheathed leaves (scale-like acicles) of several years' duration, rarely one (deciduous); leaves very small, scale-like, sharp-pointed. Androphores ament-like, drooping, with minute, sharp-pointed scales; androsporangia globular; dehiscence irregular. Carpophores (ovule-bearing aments) very short, of few woody

or fleshy scales; after fertilization becoming globose or berry-like by coalescence; ovules erect, two or more under each scale. Seed solitary.

Family 29. JUNIPERACEÆ. Juniper Family.

Trees or shrubs diœcious, with leaves single, opposite, four-ranked, scale-like, minute and closely suppressed, or six-ranked (verticillate in threes), linear, pointed, divaricate. Trees of very slow growth; wood exceedingly fine-grained and durable; bark very thin, and separating, when old, into long, ragged shreds. Androphores with numerous ovate and peltate scales; the ovate scales, near the base, barren; scales at middle and tip of ament inversely shield-shaped and sharp-pointed, each an androphyl; at the base of each androphyl four to six globular androsporangia. Carpophores small, conoid, globular, or oblong, making a greatly modified, almost consolidated cone of three juicy scales coalesced into a berry, and enclosing a single bony-coated seed; otherwise dry and chartaceous, in which the scales open at maturity to liberate the seed.

171. *Juniperus communis* L. Juniper. Often grows but rarely does well in this dry climate when planted in parks.

172. *Juniperus hibernicæ* Loodiges. Irish Juniper. Occasional in cultivation in cemeteries; not well acclimated.

173. *Juniperus hemisphærica* Presl. Dome Juniper. A dozen trees, with short, stout, erect trunks, planted over thirty years ago on the thin soil of the limestone summit of Mount Oread, in front of Fraser Hall, at the Kansas University, Lawrence, are in excellent health and growing vigorously. They now have trunks six to nine decimeters around at the ground, a height of twelve decimeters, and a spread of branches on the ground fully nine meters across, thus making low, broad, beautiful domes.

174. *Juniperus virginiana* L. "Red Cedar"; Tree Juniper. Native on northern bluff sides, where protected from annual fires; various counties of the state; rare, scattered, and gradually disappearing, except where planted near residences, in parks, etc. April. (A. S. U.) People are now allowing these beautiful trees to become destroyed by bagworms (*Thyridopterix*) and cedar-apples (*Gymnosporangium*), when a very little judicious attention each year, even less than it took to plant them, would save them. Neglect of the trees in such manner is reprehensible and ought to be considered criminal, in allowing those insects and fungi to multiply and scatter to destroy one's neighbor's trees, not only the junipers, but the apple orchards near.

Family 30. CUPRESSACEÆ. Cypress Family.

Monoecious trees or shrubs, with minute, opposite, appressed, four-ranked or scattered scale-like leaves. Carpellate cones small, globular or oblong, of few valvate or peltate scales, sometimes only two fertile; ovules erect, two or more under each fertile scale; cotyledons two, rarely more.

175. *Thuja occidentalis* L. "White Cedar"; Arbor-vitæ. Cultivation often attempted without much success. A few trees twenty feet high and twenty-five years old are to be seen.

176. *Thuja orientalis* L. Chinese Arbor-vitæ. Preferred by some as an ornamental tree.

177. *Thuja* (*Biota*) *tatarica* Endlicher (1830). Tartarian Arbor-vitæ. Barely reaches a height of six meters where planted; climate too hot.

178. *Thuja* (*Biota*) *sibirica* Ende. Siberian Arbor-vitæ. A very handsome and apparently hardy species (or variety); only recently introduced; gives good promise.

179. *Chamaecyparis* *thyoides* B. S. P. (Britton, Stern and Poggenburg). Southern White Cedar. Sparingly planted; does fairly well for wind-breaks.

180. *Cupressus sempervirens* L. Cypress. Occasional in cemeteries.

181. *Taxodium distichum* L. C. Richard. Bald Cypress. Leaves annual. Occasional in parks; endures the climate well; less of the twigs freeze than are cast off by ordinary annual self-pruning. Several trees in Topeka, planted forty years ago, are eight and one-half decimeters around the trunk and fifteen meters high. Frequently collected by students who mistake the trees for native.

182. *Retinospora plumosa* Siebold. Oriental Cypress. Occasional in cemeteries.

183. *Cryptomeria japonica* D. Don. Japan Cedar. In cultivation.

ORDER XV. PINALES. THE PINES AND THEIR ALLIES.

Resinous evergreen trees, with acicles for foliage, these consisting of elaminate, single linear or scale-like, or fascicled acicular or awl-shaped, leaves, in this case representing leaf-petioles that are segmented or split in prefoliation, and popularly called "needles," of one (deciduous), two, or several years' duration. Pollen-grains or androspores bilobed, apparently triple, and consisting of one generative cell carrying two antherozoids or sperms, one large central vegetative cell, and two lateral gas-filled wing-sacs, which serve to buoy the androspore long distances through the air, and to orient it on approaching an ovule (gynosporangium) on another tree; while the vegetative cell serves to nourish the generative cell in its germination in order to facilitate fecundation. Electrical conditions within certain limitations of distance furnish the stimuli that guide the spore to its required destination, thus eliminating chance to a certain extent.

Family 31. PINACEÆ. Pine Family.

Trees with acerose leaves (acicles or needles) singly or in fascicles of two to five in each fascicle, with their bases enclosed in a modified scaly basal sheath (perifascicle); perifascicular scales imbricated, usually in four ranks, the final scales often long and fimbriated. When two leaves are in a fascicle a cross-section of each is semiterete; when three or five, the form is a sector of a cylinder, corresponding to the number of leaves. Tracheids in the wood each of many elongate-polyedral cells taperingly spliced end to end, in rectilinear radial ranges, each provided with four to six vertical rows of circular membrane-covered (cellulose) pits for osmotic action of the sap from cell to cell; resin-ducts large, equal to from fifteen to fifty cells, scattered mostly through the late-season wood. Fruit a cone, formed of numerous imbricated suberoid scales upon a conical receptacle. Ovules two, in the axil of each scale, each eight-celled. Cotyledons in the embryo acicular, 8-12.

185. *Araucaria imbricata* Willdenow. Norfolk Island Pine; "Monkey-puzzle." Dioecious. Raised in houses and out; not hardy, though becoming quite frequent.

186. *Araucaria excelsa* Robt. Brown. Araucaria; Norfolk Island Pine. Occasional in private houses.
187. *Abies balsamea* L. Balsam Fir. Rare in cultivation.
188. *Abies taxifolia* Desfontaine. Silver Fir. Rare in cultivation.
189. *Tsuga canadensis* Carriere. Hemlock. Rare in cultivation. Attempts have been made to establish timber tracts of this valuable tree, but without success.
190. *Picea excelsa* Link. Norway Spruce. Occasional in parks. Appears to do fairly well, though not so well as might be hoped.
191. *Picea mariana* Sargent. Black Spruce. Occasional in cultivation.
192. *Picea pungens* Engelmann. Blue Spruce. Does satisfactorily where planted; grows vigorously and is very beautiful.
193. *Picea alba* Link. White Spruce. Frequent in cultivation.
194. *Pinus echinata* Miller. (*P. mitis* Michaux.) Yellow Pine. Naturalized in several counties of southeastern Kansas, and planted successfully elsewhere to a small extent. May have once been native in Cherokee county; but doubtful if it ever grew native more than ten miles from the southeast corner.
196. *Pinus sylvestris* L. Scotch Pine. Apparently becoming naturalized in several places in eastern Kansas, adjacent to old Scotch plantations and nurseries. Planted extensively over the state.
197. *Pinus austriaca* Höss. Austrian Pine. Extensively planted throughout the state, equally with the Scotch pine.
198. *Pinus strobus* L. White Pine. Does well after having become established and able to send its spongioles down below the immediate effects of too much sunshine and water.
199. *Pinus monticola* Douglas, var. *latifolia* Engelmann. Dwarf Mountain Pine. Doing so well in cultivation that the trees bid fair to be standard in height, not dwarf.

Superphylum BBB. ANGIOSPERMÆ. Angiosperms.

HIDDEN-SEED CARPELLATES.

Endogenous or exogenous trees, shrubs, or herbs, with unisexual or bisexual flowers, conspicuously provided with a foliaceous perianth. Pollen (*androspheres*) each producing a tube. Sperms nonciliate and nonmotile. Ovules (*gynosporangia*) concealed in an ovulary at or near the base of a specially constructed seed-vessel, consisting of a folded and closed carpophyl or carpel. This ovulary is on the face side of the carpel and entirely enclosed within it, but communicating with the outer world by a long, tortuous passageway, ending in the stigma at the summit of the carpel.

Phylum * V ANTHOPHYTA. Anthophytes.

Flowering Angiosperms.

Carpel a closed cavity formed by the uniting of the margins of a specialized leaf (*carpophyl* or *carpel*), thus forming a simple pistil, including always an ovulary and whatever of style and stigma are present. Usually several such leaves (carpels) are in a whorl, with their faces toward a common center, forming a compound pistil or *gynæcium*. The ovules (*gynosporangia*) are borne on the inner surface of the carpel cavity (the

ovulary), and within it the seeds are matured. Seeds contain an embryo or minute future plant with cotyledons one or two.

Usually surrounding the gynœcium, when the plant is bisexual, are to be found a whorl of stamens or *androphyls*, called an *andrœcium*, each member of which bears at its summit an anther holding one or two double (rarely one single) androsporangia, which develop and hold the pollen (androspores); these are discharged at the proper time through specially prepared openings. Each androspore contains one or more nonmotile sperms.

Pollination is the act of a pollen-grain (androspore) alighting on the stigma (a specialized portion of the tip of a carpel), germinating there, and sending out a pollen-tube, which penetrates the tissues of the carpel along a specially prepared path, cleared for the passage of the pollen-tube and for no other purpose; and finally, on reaching an ovule in an ovulary near the foot of the carpel, the pollen-tube enters the ovule by its orifice (the micropyle or "little gate"), or rarely at the chalaza, after which it penetrates the nucellus and passes through the wall of the gynospore or embryo-sac, carrying with it two sperm cells.

Fertilization is effected by one of these sperm cells from the end of a pollen-tube coming in contact with the nucleus of an egg-cell in the embryo-sac (gynospore) within an ovule (gynosporangium) and fusion with it. The other sperm-cell may unite with the definitive nucleus to form the endosperm. The limits of such double fertilization are not yet known, but it is believed to be general, if not universal, in anthophytes.

When the gynœcium is surrounded on the same flower by an andrœcium, the flowers are called *perfect*; in case the gynœcia and androecia are in different flowers on the same plant, the plant is *monœcious*; when such flowers are on different plants or trees, such plants or trees are *diœcious*.

Flowers in anthophytes are nearly always surrounded by specially formed protecting leaves. In the Glumiferae such protecting leaves are called scales, glumes, palets, perigynia, bracts, etc. Such flowers are always *anemophilous*, pollenized by the wind. In the Petaliferae and dicotyls such protecting leaves are called *perianth*, which consists of two whorls called *calyx* and *corolla*, the several members of which are *sepals* and *petals*, either or both of which may be found enveloping a flower. The inner whorl, the petals, are prominent, high-colored and showy, to attract insects. Such flowers are *entomophilous* (insect-loving), pollenized by insects. Outside of the calyces, subtending groups of compound flowers, are to be found special systems of green leaves forming an *involucre*, the members of which are bracts, scales, etc.

Subphylum DD. MONOCOTYLEDONES. Monocotyls.

SINGLE-SEED-LEAF ANTHOPHYTES.

Stems endogenous, with no distinction or separation into wood, bark, or pith, and without medullary-ray plates. Plants represent continuous growth and formation at once, the accretions of new material being made all through the interior, which consists of a mass of soft parenchymatous tissue, interspersed with closed bundles of fibrovascular ducts (wood cells). Leaves (mostly laminodia and phyllodia, the blades being as flattened and modified petioles, rarely with laminæ at their tips) alternate, entire; nerva-

tion almost invariably parallel, the distal ends often radiating, campylo-drome, or convergent; stomata (except in the *Smilacales*) longitudinally intracellular on both surfaces; the bases (sheaths) of the laminodia or phyllodia always with parallel nervation, greatly elongated, and commonly sheathing the stem of the plant. Parts of the flower in threes or a multiple of three, seldom in fours, rarely or never in fives. Embryo usually with a single terminal cotyledon and a lateral plumule.

CLAS IX.* GLUMIFERÆ. GLUME-BEARERS.

Monocotyl, with Glumaceous Perianth.

Floral envelopes glumaceous, persistent, or none. Perianth chaffy or of membranous or scarious scale-like or bristle-formed segments free from the ovulary. Fruit usually a grain inclosed in a husk, or a naked nut-like achene, rarely a utricle.

Subclass A. GLUMIFLORÆ. Husk-flowers.

GLUME-FLOWERED MONOCOTYLS.

Perianth three- or six-parted, the parts glumaceous, or of fewer hyaline scales, or mere bristles, or entirely wanting. Flowers solitary and sessile, in the axils of and subtended by or inclosed in husk-like scales or glumaceous bracts (glumes or chaff), or clustered in umbelloid or corymbose chaffy panicles in the axils of leafy bracts. Andrœcium normally of three or six stamens, though usually three or fewer, all with bisporangiate anthers. Pollination anemophilous. Gynœcium with a single unilocular one-ovuled ovulary, with styles two (one or three), and stigmas hairy or plumose. Fruit a grain or an achene, or a three-valved loculicidal capsule containing few or many seeds. Endosperm farinaceous.

ORDER XVI. POALES. THE GRASSES AND CANES.

Erect plants, usually herbaceous and perennial, rarely woody and arborescent, as in *Bambusaceæ*. Stems (culms) generally hollow, with solid nodes; sometimes comparatively solid throughout, as in common cornstalk; normally terete, with or without a groove on the side of the stem next each leaf, and always with a firm fibrous exterior and silicious cuticle.

Foliage consists of narrow, linear, dorsally compressed laminodia (never in this latitude with a true lamina and petiole), alternately on opposite sides of the stem. A *laminodium* of a grass consists of two conspicuous parts: (a) The upper or distal part, called the *blade*, corresponding to the petiole of a dicotyl leaf, which part is usually firm, flat, carinate, linear, parallel-nerved, and answers the same purpose as a dicotyl leaf, with important differences; and (b) the lower or proximal part, called the *sheath*, corresponding to the base of a dicotyl leaf, which part is generally lengthened and broadened, and surrounds and infolds the stem of the plant, with the edges free and separate or slightly overlapping, and having a small ciliate or smooth ring (ligule) at its summit or its junction with the blade.

Inflorescence paniculate, racemose, or spicate, consisting of flat spikelets composed of one to many florets, each spikelet subtended by an involucrel of two glumaceous "empty scales," which may be larger than the flowering glumes, equal to them in size, or smaller, or either one or both entirely wanting. They may themselves be equal or unequal in size. The rachilla is articulated below the scales in *Panicaceæ*, above in *Poaceæ*.

Flowers (florets) perfect or unisexual, monœcious or dioecious. Perianth hypogynous, consisting of a dorsal glumaceous or hyaline sepal, called a *glume*, *flowering glume*, or *lemma*, and a double ventral sepal or a pair of ventral sepals modified and fused together into a single glumaceous leaf that partially encloses the seed and is called the *palet* or *palea*, these retaining their two carinæ and two points (teeth). Inside of these all that remain of three petals are one to three, usually two, minute hyaline scales dorsally (rarely one ventrally) placed and called *lodicules*.

Andrœcium of one to six, usually three, stamens; filaments slender; anthers bisporangiate (two-celled), exserted, versatile or adnate.

Gynœcium of two or three united carpels, rarely one. Ovary unilocular, one-ovuled. Styles two or three, distinct or united, rarely one. Stigmas usually plumose. Fruit a seed-like grain (caryopsis), with a large farinaceous endosperm and a small embryo on the side opposite the hilum.

(This is the most important of all botanical orders, on account of its farinaceous seeds, which furnish the principal food of mankind, and of its herbage, which furnishes the principal food of domestic animals.)

Family 32. PANICACEÆ. Panic-grass Family.

Includes the following tribes: *a*, *Maydæx* with spikelets unisexual; *b*, *Andropogonæx*, with spikelets in pairs; *c*, *Panicæx*, with spikelets perfect and spheroidal; and *d*, *Oryzæx*, with spikelets laterally compressed.

Plants herbaceous, annual or perennial; culms always annual. Spikelets one- or two-flowered, subtended by an involucl of one or two empty scales, usually two; when two-flowered, the first or lower is staminate, the upper one perfect and fertile; rachilla articulated below the empty scales, the spherical or dorsally compressed spikelets falling from the pedicels entire, either singly or in groups, together with joints of the articulate rachilla.

Tribe *a*. *Maydæx*. Maize Tribe. Spikelets monœcious; staminate and carpellate flowers on different parts of the same plant. Flowering glume and palet hyaline.

201. *Euchlæna luxurians* Schrader. Teosinte (God-gift Grass); Guatemala Grass. Planted for fodder. Does not ripen seeds here. Occasional.

202. *Zea mays* L. Indian Corn; Maize. Includes dent, flint, pop, sugar corn, and other horticultural subspecies. Survives the winter occasionally for a year or so, with but slight tendency toward becoming naturalized.

203. *Tripsacum dactyloides* L. Gama-grass. Sloughs and wet places all over the state, as far west as Ellis and Kinsley, or further; common; but rare beyond the points named. June. (ASU)

Tribe *b*. *Andropogonæx*. Blue-stem Tribe. Spikelets in compound racemose spikes, two at each joint of the articulate rachis, the one sessile and perfect, the other pedicellate, and either staminate, neuter, or reduced to a mere pedicel and minute scale; empty involucl scales as large as the flowering glume and very firm; flowering glume usually awned and subtending a palet and perfect flower. Rachillæ and barren pedicels usually bearded.

204. *Coix lachryma-jobi* L. Tear-grass; Job's Tears. Often survives the winter and grows spontaneously from self-sown seeds. Not naturalized.

205. *Eulalia japonica* Trinius. *Eulalia*. Raised in gardens for its beauty.
206. *Imperata sacchariflora* Maxim. "Emperor-grass"; Great Blady-grass. Rare in gardens.
207. *Erianthus ravennæ* Beauvois. Plume-grass. Cultivated in parks and lawns occasionally.
208. *Andropogon scoparius* Mx. Little Bluestem; Besom Beard-grass. Dry soils and hillsides all over Kansas; common. Aug. (ASU)
209. *Andropogon virginicus* L. Virginia Beard-grass. Scattered throughout the eastern part of the state; not common. Aug. (ASU)
210. *Andropogon furcatus* Muhl. (Not *A. provincialis* Lam.) Bluestem. All over the valley lands of eastern Kansas, and working westward in the well-drained valleys of the western part. Does not stalk up and bear seed where too dry. Aug. (ASU)
211. *Andropogon chrysocomus* Nash. Yellow-haired Beard-grass. Dry soil, southwestern Kansas, according to Nash.
212. *Andropogon hallii* Hackel. Great-plain Beard-grass. Sandy lands of western and southwestern Kansas. Aug. (ASU)
213. *Andropogon torreyanus* Steudel. Staked-plain Beard-grass. Dry soil, southern and southwestern Kansas; frequent. Aug. (ASU)
214. *Sorghastrum avenaceum* Nash. (*Chrysopogon* Benth.) Indian grass. On comparatively damp and broken prairies, hedge shades, etc., throughout the state; frequent to common. Aug. (ASU)
215. *Sorghum halepense* Persoon. Johnson Grass; Aleppo-grass. Occasional on the lower dry prairies of southern Kansas. July. (A)
216. *Sorghum vulgare* Pers. Kafir, Durra or Egyptian Corn; Egyptian Millet; Shallu; Kaoliang; Guinea-corn; Milo-maize; Dwarf Milo. Seeds of these varieties often survive the winter and grow spontaneously.
217. *Sorghum saccharatum* Willd. Sorghum; Chinese Sugar-cane; Im-pee; Broom-corn. Common in cultivation.

Tribe *c. Panicææ*. Panic-grass Tribe. Spikelets perfect, terete or dorsally flattened, in racemes or panicles; involuclate scales one or two, the first, when present, always small; glumes one or two, membranous, unequal; first flowering glume, when present, sometimes contains a staminate flower; uppermost flowering glume always firmer in texture than the outer scales; it and the palea indurated and firmly clasped together, inclosing the grain and falling away with it and with the scales of the involucl, the rachilla being articulated below the scales.

218. *Paspalum mucronatum* Muhl. (*P. fluitans* Kth.) Floating Water-grass. In water or very wet spots, Miami to Cherokee county; not common. Sept. (AS)
219. *Paspalum læve* Mx. Water-grass. Moist fields, E. K., west to Barton county; not common. Aug. (AS)
220. *Paspalum angustifolium* Le Conte. Narrow-leaf Water-grass. Sandy soils, E. and S. E. K.; frequent. Aug. (AS)
221. *Paspalum glabratum* Mohr. Smooth Water-grass. Moist places, S. E. K.; frequent. Aug. (AS)
222. *Paspalum stramineum* Nash. Straw-colored Water-grass. Sandy soil, N. K.; occasional. July. (AS)

223. *Paspalum setaceum* Mx. Downy Water-grass. Sandy soil, central and western Kansas; frequent. June. (AS)

224. *Eriochloa punctata* Hamilton. (*E. polystachya* H. B. K.) Dotted Wool-grass. Dry prairies, S. and S. W. K.; occasional. July. (AS)

225. *Syntherisma filiformis* Nash. (*Digitaria* Koeler.) Slender Crab-grass. Sandy soil, E. K.; frequent. July. (ASU)

226. *Syntherisma lineæis* Nash. (*Panicum* Krock). Smooth Crab-grass. Introduced and frequent in waste places, E. K. June. (ASU)

227. *Syntherisma fimbriata* Nash. Fringed Crab-grass. Frequent in fields, etc., E. K. June. (ASU)

228. *Syntherisma sanguinalis* Dulac. (*Panicum* L.) Crab-grass; Finger-grass. Fields and waste places, eastern and middle Kansas, and spreading westward; should be utilized wherever it becomes too common. Frequent and close mowing of lawns in this sunny climate disheartens blue-grass and encourages the growth of crab-grass; pasturing, if not too close, reverses that. June. (ASU)

229. *Brachiaria obtusa* Nash. (*Panicum* H. B. K. = Humboldt, Bentham and Kunth.) Little Arm-grass. Extreme southwest Kansas; 3-7 dm.; stoloniferous; not common. June. (AS)

230. *Leptoloma capillaris* (L.) (*Panicum* L.) Old-witch-grass; Tickle-grass. In plowed fields all over the state; a real pest in barren fields, and often in stubble-fields of eastern Kansas; 3-6 dm.; common. July.

231. *Leptoloma barbipulvinata* (Nash.) (*Panicum* Nash.) Yellow-stone Witch-grass. Open ground, C. and N. W. K.; 1-4 dm.; occasional. July. (AS)

232. *Leptoloma cognatum* Chase. (*Panicum autumnale* Bosc.) Fall Witch-grass. Dry soil, C. K.; 3-6 dm. high; common. July. (ASU)

233. *Leptoloma miliacea* (L.) (*Panicum* L.) Hog Millet. Roadsides, E. K.; introduced as a crop and escaped from cultivation. Rare. July.

234. *Leptoloma dichotomiflora* (Mx.) (*Panicum geniculatum* Muhl.) Great Spreading Witch-grass. Rich damp soil, with stout creeping root-stocks simulating a perennial; commonly 10-18 dm. long; becoming frequent in E. K., especially in rich soil near houses, barns, parks, etc. July. (ASU) An excellent forage grass and worthy of cultivation, except that it is liable to smut.

235. *Panicum virgatum* L. Tall Panic-grass; Switch-grass; Fly-switch Panic-grass. Rich dry or moist soils, where the air is not too dry; in western Kansas in valleys only; farther east on hillsides and uplands as well; 6-12 dm. high; very common. July. (ASU)

236. *Panicum agrostoides* Sprengel. Redtop Panic-grass. Wet grounds, S. K., as far west as Arkalon; 4-8 dm. high; occasional. July. (AS)

237. *Panicum anceps* Mx. Flat-stem Panic-grass. Moist sandy soils, in thickets, S. E. K.; occasional; 4-10 dm. July. (AS)

238. *Panicum depauperatum* Muhl. Spindly Panic-grass. Dry, open places, poor soils, C. K.; 2-4 dm.; not common. Kansas soil is generally too rich for it. June. (S)

239. *Panicum linearifolium* Scribner. Long-leaf Panic-grass. Sandy soil, in woodlands, S. E. K.; 2-4 dm.; slender; frequent. June. (AS)

240. *Panicum perlongum* Nash. Prairie Panic-grass. Dry prairies, N. and C. K.; 1-4 dm.; occasional. June. (A)

241. *Panicum lindheimeri* Nash. Prostrate Panic-grass. Dry sandy soil, Sumner county; 4-8 dm. long; infrequent. July. (S)

242. *Panicum huachucae* Ashe. Villous Panic-grass. Prairies and sandy fields, general; 3-7 dm. high; frequent. May-Sept. (ASU)

243. *Panicum silviculum* H. & Ch. Satiny Panic-grass. Woods and clearings, E. and S. E. K.; 4-8 dm. high; occasional. July. (AS)

244. *Panicum tennesseense* Ashe. Tennessee Panic-grass. Moist ground near woods, S. E. K.; 2-5 dm.; rather rare. July. (S)

245. *Panicum præcocius* H. & Ch. Early Panic-grass. Dry prairies, N. K.; 1-3 dm.; rare. May. (A)

246. *Panicum sphærocarpon* Elliott. Bird-shot Panic-grass. Dry soil, thickets, E. K.; 2-6 dm.; frequent. May. (ASU)

247. *Panicum scribnerianum* Nash. Susquehanna Panic-grass. Dry or moist sandy soil, nearly all over Kansas; 2-5 dm. high; common. June. (ASU)

248. *Panicum leibergii* Scribn. Iowa Panic-grass. Prairies, N. E. K.; 3-5 dm.; rare. June. (A)

249. *Panicum wilcoxianum* Vasey. Nebraska Panic-grass. Prairies, gardens, shades, Shawnee county northward; 1-2 dm. high; common, or at least frequent. July. (AS)

250. *Panicum clandestinum* L. Hispid Panic-grass. Thickets, E. K.; 7-11 dm. high; occasional. June. (AU)

251. *Panicum latifolium* L. (*P. macrocarpon* Le C.) Broad-leaf Panic-grass. Rocky woods, E. K.; 4-6 dm. high; frequent. July. (ASU)

252. *Panicum boscii* Poir. (*P. porterianum* Nash.) Forestine Panic-grass. Dry soil, in woods, S. E. K.; frequent. July. (S)

253. *Echinochloa crus-galli* Beauv. (*Panicum* L.) Cockspur-grass; Barnyard grass. Low grounds and in rich waste soils; common all over the state. Apparently native, rather than introduced. June. (ASU)

254. *Echinochloa walteri* Nash. (*Panicum* Pursh.) Salt-marsh Cockspur-grass. Saline lands along the Arkansas valley from Great Bend down; also S. E. K.; frequent. July. (ASU)

255. *Echinochloa colona* Link. (*Panicum* L.) Jungle-rice. Dry soil from Hutchinson southwest; not common. Similar to the two preceding grasses, but with awnless scales. July. (AS)

256. *Chætochloa glauca* Scribn. (*Panicum* L.) Yellow Pigeon-grass; "Bottle-grass." Common in all dry soils. July. (ASU) Spikes 1-10 cm. long.

257. *Chætochloa imberbis* Scribn. Beardless Pigeon-grass; Seaside Pigeon-grass.

Panicum glaucum L. Michx., as shown by A. S. Hitchcock, in "Grasses of Michaux's Flora Boreali-Americana," 1803, in Contrib. from U. S. Nat. Herbarium, xii, No. 3 (1908), p. 146. Professor Hitchcock also shows (p. 132, same volume and number) that Hans Sloane, in his History of Jamaica (1725 or earlier), had called the grass "*Gramen panicum spica simplici lævi*," which, of course, is no name at all, but may have been the suggestion that led to the use of the word *lævigata* by Muhlenberg, a name already used by Lamarck for another grass.—See *Flore de France*, ed. 1778, iii, p. 578.

(?) *Panicum imberbe* Poir. Encyc. Supp. 4 (1816), p. 272. This citation is very questionable, and needs verification by original type specimens in herbarium.

Panicum lævigatum Muhl. Elliott, Sk. Bot. S. C. & Ga., i (1817), p. 112. Not. *p. lævigatum* Lam. (See citation above.)

Setaria imberbis (Poir.) Roemer & Schultes, Syst. ii (1817), 891. Coulter, Contrib. U. S. N. H., i (1890), p. 55, No. 678; same, vol. ii, No. 3 (1894), p. 510.

Setaria levigata (Muhl.) Chapm. Flo. S. S., ed. 3, p. 387.

Chætochloa glauca, var. *perennis* Curtiss. Beal's Grasses of N. A., ii (1896), p. 156.

Chætochloa imberbis (Poir.) Scribn. Bull. 4, U. S. Dept. Agr., Div. Agrost. (1897), p. 39.

Chætochloa perennis (Curt.) Bicknell. Bull. Torr. Bot. Club, xxv (1898), p. 107.

Chætochloa levigata Scribn. Bull. 21, U. S. Dept. Agr., Div. Agrost. (1900), p. 10, evidently repeated from some publication earlier.

A somewhat cespitose glabrous perennial, from slender, creeping rootstocks; culms slender, compressed, erect or ascending, somewhat geniculate at the base, scabrous below the panicle, otherwise smooth; nodes glabrous; sheaths glabrous, the lower longer than the internodes; ligule ciliate; blades 1-3 dm. long, 3-7 mm. wide, tapering to the tip; scabrous on the upper surface and margins, glabrous below. Panicles dense, spike-like, 2-5 cm. long, 1 cm. thick; exclusive of the setæ; rachis angular, pubescent; setæ 8-12, spreading, 5-10 mm. long, yellowish or purplish sometimes. Spikelets ovate, acute, 2-2½ mm. long, surpassed by the setæ. Moist soil, New Jersey to Florida, north to Kansas. May to October. F. L. Scribner, in Bull. 21, Div. Agrost.

258. *Chætochloa perennis* (Hall & Henry). Salt-meadow Pigeon-grass.

Setaria glauca Beauv., var. *levigata* Chapm. Hall, *Plantæ Texanæ*, 1872, No. 839; Contr. U. S. Nat. Herb., iii, No. 1 (1891), 38.

Setaria perennis Hall & Henry. Dr. Joseph Henry, of Salina, Kan., in Bulletin of Washburn Lab. of Nat. Hist., by F. W. Cragin, ii (1889), p. 63.

Setaria glauca, P. Br., var. *levigata* Chapm. Coulter, Contr. U. S. Nat. Herb., i (1890), p. 55 (No. 677).

Setaria perennis Hall. Smyth, in Check-list of the Plants of Kansas, Aug. 1892, p. 26 (No. 1728, incorrectly credited and imperfectly described). Same improper entry repeated in Transactions Kansas Acad. of Science, xiii (1893), p. 192.

Setaria glauca (L.) Beauv., var. *levigata* (Muhl.) Chapm. Coulter, in Cont. U. S. Nat. Herb., ii, No. 3 (1894), p. 509.

Chætochloa versicolor Bicknell. Bull. Torr. Bot. Club, xxv (1898), p. 105, pl. 329.

Chætochloa imberbis perennis (Hall) S. & M. Bull. 21, U. S. Dept. Agr., Div. Agrost. (1900), p. 12.

Setaria imberbis R. & S., var. *perennis* (Hall) Hitchc. Gray's Manual, 7th ed., 1908.

Culms scarcely tufted, slender, decumbent, ascending, or erect, 6-11 m. long; blades 2-6 dm. long; spike cylindrical, simple or slightly compound, long-exserted, 2-6 cm. long; spikelets generally purplish; bristles few, slender, yellowish-green, shading to purple, and scarcely extending beyond the spikelets. Propagates freely by slender perennial rootstocks, and seldom ripens seed where cattle freely graze. Frequent in damp alkaline and saline bottoms and meadows in Shawnee, Wabaunsee, Dickinson, Saline, McPherson, Reno, Sedgwick, Kingman, Pratt, Meade, Seward, and other counties of central and southern Kansas. August. (AS) A variable species; several forms, probably all of the same species, occur in Kansas.

The following perennial panicles, in which the panicle is a simple cylindrical or somewhat compound spike, the rachis of the inflorescence is prolonged beyond the upper spikelet into an awn or bristle, and one or more persistent setæ are inserted on the rachis below the articulation of the spikelets, thus answering the principal requirements of *Chætochloa* as now delimited by botanists, should be removed from the very large and heterogeneous genus *Panicum*, and added to the restricted genus *Chætochloa*, with which they are more nearly allied:

259. *Chætochloa reverchoni* (Vasey) n. comb. (*Panicum reverchoni* Vasey, Bull. No. 8, Bot. Div., Dept. Agr., p. 25.) Chapparral Millet. High lands of central and northern Texas.

261. *Chætochloa ramisetum* (Scribn.) n. comb. (*Panicum subspicatum* Vasey, same bulletin and page as above, 1889, name preoccupied; *P. ramisetum* Scribn., Circ. 27, Div. Agrost., Dept. Agr., p. 9; 1900.) Hidalgo Pigeon-grass. Plains of southern and western Texas.

261. *Chætochloa occidentalis* Nash. Western Pigeon-grass. Reported from Kansas.

262. *Chætochloa viridis* Scribn. Pigeon-grass; "Green Foxtail." General over the state; introduced; common. (ASU) Where this grass grows freely in rich cultivated ground the panicle is greatly increased in size, becoming decompound and heavily seeded, much like the next two.

263. *Chætochloa italica* Scribn. Italian Millet. Inclined occasionally to escape from cultivation; not naturalized. When it runs wild it tends to revert to a form approaching the preceding.

264. *Chætochloa germanica* (Mill.) Hungarian Grass. Escapes for a year or two; not naturalized.

265. *Chætochloa verticillata* Scribn. Bur Pigeon-grass; "Bristly Foxtail." Douglas county; rare. (S)

266. *Cenchrus carolinianus* Walt. (Not *C. tribuloides* L.) Bur-grass; "Sand-bur." Sandy lands and neglected fields anywhere; too frequent on some farms; it loves indolent people. An excellent fodder when cut young. (ASU)

267. *Penicillaria spicata* Willd. (*Pennisetum typhoideum* Rich.) Pearl Millet. Occasional in cultivation.

Tribe *d. Oryzæ*. Rice-grass Tribe. Spikelets unisexual or perfect, in loose panicles; rachilla articulated below the scales; spikelets laterally compressed; stamens often 6.

268. *Zizania palustris* L. Indian Wild-rice; Water-oats. Frequently introduced by hunters and planted as food for wild ducks in little lakes of Linn, Miami, Johnson, Douglas, Franklin, Sedgwick and other counties of eastern and southern Kansas; yet not often seen; does not appear to do well. June.

269. *Homalocenchrus virginicus* Britt. White Cut-grass. Wet spots and slow streams, E. K.; frequent. Aug. (ASU)

270. *Homalocenchrus oryzoides* Pollich. Rice Cut-grass; Scratch-grass. Marshy and meadow lands, E. and S. K.; rare. Aug. (ASU)

271. *Homalocenchrus lenticularis* Scribn. Catchfly Cut-grass. Wet grounds, E. and S. K.; frequent. July. (ASU)

Family 33. POACEÆ. Meadow-grass Family.

Spikelets laterally or dorsally compressed, one-to many-flowered, the rudimentary floret, if any, usually uppermost; the rachilla articulated above the two "empty scales" of the involucre (below them in *Alopecurus*, *Poly-pogon*, *Cinna*, *Holcus*, *Sphenopholis*, *Spartina*, and *Beckmannia*). When the spikelets have two or more florets there is an articulation of the rachilla below each floret, so that the seeds fall either singly or in groups, leaving the two involucre scales attached to the end of the rachilla. The family comprises the following tribes: Tribe *e*, *Phalaridæ*, with empty scales two, and sterile glumes two; tribe *f*, *Agrostidæ*, with empty scales two; tribe *g*, *Avenæ*, with two or more flowers in each spikelet; tribe *h*, *Chloridæ*, with spikelets in two rows on each of several preæstivally di-

vided spikes; tribe *i*, *Festuceæ*, with spikelets pedicellate in racemes, or in dense or loose panicles; and tribe *k*, *Hordeæ*, with spikelets sessile alternately on opposite sides of a zigzag channeled rachis.

Tribe *e*. *Phalaridæ*. Canary-grass Tribe. Inflorescence spicate or paniculate; spikelets crowded on the spike, one- rarely three-flowered empty scales of the involucl below the first articulation of the rachilla, large and showy; the two sterile glumes small and narrow, rarely subtending staminate flowers; the fertile glume with a two-nerved or nerveless palea and a perfect flower.

272. *Phalaris arundinacea* L. Reed Canary-grass. The variety *picta* L., ribbon-grass, is frequent in gardens and spreads a little where planted; but does not run wild.

273. *Phalaris caroliniana* Walt. Carolina Canary-grass. Escapes from cultivation occasionally for a year or two; not seen as a wild grass. June.

274. *Phalaris canariensis* L. Canary-grass. Often escapes from cultivation for a short time. July.

275. *Anthoxanthum odoratum* L. Sweet Vernal-grass. An introduced grass, growing freely in lawns where planted, but not disposed to run wild.

276. *Oryzopsis micrantha* Thurb. Small-flowered Mountain-rice. Dry soils, Cheyenne county; rare. June. (S)

277. *Oryzopsis asperifolia* Mx. White Mountain-rice. Woods, N. E. K.; occasional. June. (S)

278. *Oryzopsis melanocarpa* Muhl. Black Mountain-rice. Rocky woods, Cherokee county; rare. July. (A)

279. *Oryzopsis membranacea* Vasey. Silky Mountain-rice. Sandy or gravelly prairies, not far from streams, Cheyenne, Sherman, Wallace, and Logan counties; rare. July. (AB)

Tribe *f*. *Agrostidæ*. Reed-grass Tribe. Spikelets perfect, one-flowered, the involucl scales as long as or longer than the floral glume; rachilla sometimes prolonged behind the palea into a naked or plumose bristle; palea two-nerved, double-nerved, one-nerved, nerveless or wanting.

280. *Stipa viridula* Trin. Wild-oat Weather-grass. Dry grounds, N. K.; infrequent. July. (AS)

281. *Stipa vaseyi* Scribn. (*S. viridula vaseyi*.) "Sleepy-grass"; Stout Weather-grass. Said to grow in the Cimarron river bottoms in Morton and Stevens counties. June.

282. *Stipa avenacea* L. Black-oat Weather-grass. Dry woods and thickets, E. K.; frequent. May. (ASU)

283. *Stipa comata* Trinius & Ruprecht. Thread-needle Weather-grass. Dry plains, W. K.; occasional. June. (ASU)

284. *Stipa Sparteae* Trin. Porcupine Weather-grass. Low prairies, E. K.; common. June. (ASU)

285. *Aristida dichotoma* Mx. Poverty-grass. Sterile soils, E. K., west to Hutchinson; rare. Middle (longest) awn at right angles to spikelet. August. (ASU)

286. *Aristida curtissii* Nash. Atlantic Poverty-grass. Reported from Kansas by Nash.

287. *Aristida basiramea* Engelm. Forked Poverty-grass. Dry soils, more frequent in E. K. July. (AS)
288. *Aristida ramosissima* Eng. Branching Aristida. Dry prairies, many counties of E. K.; frequent. Longest awn reflexed. July. (ASU)
289. *Aristida fasciculata* Torr. (*A. dispersa* Trin. & Rupr.) Bushy Aristida. Dry plains, S. W. K.; frequent. Aug. (AS)
290. *Aristida oligantha* Mx. Few-flowered Poverty-grass Thin, dry soils, generally distributed. Aug. (ASU)
291. *Aristida gracilis* Ell. Slender Poverty-grass. Dry soils, E. and S. E. K.; not common. Aug. (AS)
292. *Aristida purpurascens* Poir. Purplish Dogtown-grass. Common in dry soils and generally distributed. Sept. (ASU)
293. *Aristida fendleriana* Steudel. (*A. purpurea* Nutt., in part.) Purple Dogtown-grass. Common in prairie-dog towns and other dry barren spots, W. K. July. (ASU)
294. *Aristida longiseta* Steud. (*A. purpurea* Nutt., in part.) Long-awned Dogtown-grass. Common in dry soils, E. and C. K. Aug. (ASU)
295. *Aristida intermedia* Scribn. & Ball. Spreading Three-awned-grass. Dry soil; awns all spreading. Aug. (A)
296. *Aristida divaricata* Humb. & Bonp. (*A. humboldtiana* Trin.) Great-plains Aristida. Sandy plains, S. W. K.; occasional. Aug.
297. *Aristida desmantha* Tr. & Rupr. Western Three-awned-grass. S. W. K.; not common. Aug. (S)
298. *Muhlenbergia sobolifera* Trin. Rock Wood-grass. Rocky woods, S. E. K.; not common. Sept. (ASU)
299. *Muhlenbergia mexicana* Trin. Meadow Wood-grass. Damp soils, all over the state; common. Aug. (ASU)
300. *Muhlenbergia racemosa* B. S. P. Marsh Wood-grass. Damp lands, everywhere; not common. Aug. (ASU)
301. *Muhlenbergia sylvatica* Torr. Wood-grass. Moist woods, E. K.; frequent. Aug. (ASU)
302. *Muhlenbergia comata* Benth. Hairy Wood-grass. Prairies, S. W. K.; occasional. Aug. (S)
303. *Muhlenbergia schreberi* Gmel. (*M. diffusa* Schreb.) Satin-grass; "Nimble-will." Dry hills and woods, C. to E. K.; frequent. Aug. (ASU) Astonishing though it may seem, the seed of this grass has been sold in Topeka for bluegrass seed.
304. *Muhlenbergia tenuiflora* B. S. P. (*Agrostis* Willd.) Slender Satin-grass. Rocky woods, E. K.; not common. Aug. (S)
305. *Muhlenbergia microsperma* Trin. Desert Satin-grass. Dry soil, S. W. K.; infrequent. Aug. (S)
306. *Muhlenbergia capillaris* Trin. Hair-like Satin-grass. Dry sandy or rocky soil, Labette county; not common. Sept. (ASU)
307. *Muhlenbergia gracillima* Torr. Silky Satin-grass. Prairies, S. W. K.; not common. Sept.
308. *Muhlenbergia pungens* Thurber. Prairie Satin-grass. Prairies, W. K.; frequent. Aug. (ASU)
309. *Brachyelytrum erectum* Beauv. Bearded Satin-grass. Low ground at Kaw's mouth; not common. July. (AS)

310. *Phleum pratense* L. Timothy. Fields and meadows, as cultivated; not thoroughly naturalized, though it sometimes escapes for a few years. Is perpetuated through annual tubers.

311. *Alopecurus agrestis* L. Slender Foxtail. Along railroads and waste places; from the east.

312. *Alopecurus geniculatus* L. Floating Foxtail. Wet soils, E. K.; not common. July. (ASU)

313. *Alopecurus aristulatus* Mx. Water Foxtail. Water and wet places, general; frequent. July. (ASU)

314. *Alopecurus pratensis* L. Meadow Foxtail. Meadows, E. K.; common. June. (ASU)

315. *Sporobolus asper* Kth. Rough Rush-grass. Dry soil and sandy fields, E. and S. K.; occasional. Palets long-acuminate or awned. Aug. (S)

316. *Sporobolus canovirens* Nash. Southern Rush-grass. Dry sandy soil, S. E. and S. K., according to Mr. Nash.

317. *Sporobolus longifolius* Wood. Long-leaf Rush-grass. Dry soil, all over Kansas; common. Palets obtuse. Aug. (ASU)

318. *Sporobolus pilosus* Vasey. Hairy Rush-grass. Dry soil, central to S. W. Kansas; occasional. Aug. (AS)

319. *Sporobolus vaginæflorus* Wood. Sheathed Rush-grass. Dry soil, C. and S. K.; occasional. Aug. (ASU)

320. *Sporobolus neglectus* Nash. Small Rush-grass. Dry soil, N. and C. K.; common. (ASU)

321. *Sporobolus cuspidatus* Wood. Prairie Rush-grass. Dry soil, N. and E. K.; frequent. Aug. (ASU) Ligule very short; glumes cuspidate.

322. *Sporobolus brevifolius* Scribn. Mountain Rush-grass. Very dry prairies, Wallace county; occasional. Summer. (S) Ligule long; outer scale of the involucre obtuse or acute, not acuminate.

323. *Sporobolus airoides* Torr. Fine-top Salt-grass. Prairies and alkaline meadows, from Hutchinson and Russell southwest; frequent. Aug. (ASU) This grass forms a very dense and compact sod on slight hummocks several feet across and raised two to four inches above the surrounding saline prairie.

324. *Sporobolus cryptandrus* Gray. Sand Dropseed. Sandy soil, general; common. Aug. (ASU)

325. *Sporobolus argutus* Kth. Pointed Dropseed-grass. Southern Kansas; not common. July. (AU)

326. *Sporobolus heterolepis* Gray. Rank Dropseed. Dry soils, N. K.; not common. Aug. (A)

327. *Sporobolus texanus* Vasey. Texas Dropseed. Dry soil, Clark and Meade counties; rare. Collected in Cloud and Republic counties by Prof. J. H. Schaffner; this is the "farthest north" record for this grass. Aug. (S)

328. *Sporobolus asperifolius* Thurb. Rough-leaf Salt-grass. Dry, alkaline soils, W. K.; frequent. Aug. (ASU)

329. *Sporobolus confusus* Vasey. Nebraska Dropseed. Dry prairies, W. K.; occasional. Aug.

330. *Cinna arundinacea* L. Sweet Wood-reed-grass. Swamps and permanent creeks, E. K.; frequent, but not common. Aug. (ASU)

331. *Agrostis alba* L. "Dew-grass"; White Bent-grass. Fields, fence-corners, and meadows, near water; E. K.; introduced. July. (ASU)

332. *Agrostis vulgaris* Withering. Redtop (Bent-grass). Same soil and region; more general in cultivation; less liable to run wild. July. (ASU)

333. *Agrostis exarata* Trin. Mountain Redtop. Eastern Kansas; common. Aug. (ASU)

334. *Agrostis asperifolia* Trin. Rough-leaf Bent-grass. Found in the states all around Kansas; not yet reported from here. Dry soil. Aug.

335. *Agrostis elliottiana* Schult. Slender Bent-grass. Chautauqua county (Hitchcock). May. (A)

336. *Agrostis perennans* Tuckermann. Thin Bent-grass. Damp, shaded places, E. K.; not common. Sept. (AS)

337. *Agrostis scabra* Wild. Rough bent-grass; "Flyaway-grass." Dry soil, not far from water, E. K.; frequent. July. (ASU)

338. *Calamagrostis canadensis* Beauv. Big Blue-joint; "Sand Reed-grass." Water and permanently wet, sandy soils; rare in Kansas. July. (ASU)

339. *Calamagrostis inexpansa* Gray. Bog Reed-grass. Swamps and low prairies, E. and N. K.; occasional. July.

340. *Calamovilfa longifolia* Hackel. Long-leaf Reed-grass. Sandy places near water, C. and W. K.; frequent. July. (ASU)

Tribe *g. Avenæ*. Oat-grass tribe. Inflorescence paniculate, seldom spicate; spikelets two- to several-flowered, the two involucre scales, when present, larger than the flowering glume, and persistent on the rachilla when the seeds have fallen; glumes bidentate, furnished with one to three awns on the back, usually from the base of the sinus between the two teeth; joints of the rachilla hairy.

341. *Holcus lanatus* L. Velvet-grass. Fields and waste places, E. K.; brought in from the east. June.

342. *Sphenopholis obtusata* Scribn. (*Eatonia* Gray.) Blunt-scale Prairie-grass. Dry soil, general; common. June. (ASU)

343. *Sphenopholis pallens* Scribn. (*Eatonia pennsylvanica* Gray.) Sharp-scale Prairie-grass. Hilly woods or moist soils, S. E. K.; west to Barton county, near streams; occasional. June. (ASU)

344. *Koeleria cristata* Pers. Crested Prairie-grass. Well-drained prairies, E. and C. K.; common. June. (ASU)

345. *Trisetum flavescens* R. & S. (*T. pratense* Pers.) Yellow Oat-grass. Meadows, E. K.; introduced; not common. July. (AS)

346. *Trisetum subspicatum* Beauv. Narrow Oat-grass. Rocky places, E. K.; occasional. August. (AS)

347. *Trisetum interruptum* Buckley. Seward to Morton counties, on dry prairies in river valleys; occasional. (SU)

348. *Avena sativa* L. Oats. Along railroads and neglected fields for a year or so outside of cultivation.

349. *Avena fatua* L. Fool Oat; Sand Oats. Woods and waste places; N. E. K.; occasional, introduced. July.

350. *Arrhenatherum elatius* Beauv. Tall Oat-grass. Fields and waste places, E. K.; introduced. June.

351. *Danthonia spicata* Beauv. Wild Oat-grass. Dry soil, N. E. K.; not common. July. (AS)

Tribe *h. Chloridæ*. Crowfoot-grass tribe. Inflorescence on split spikes, in which the apex of the culm is longitudinally sectioned or segmented in preestivation, sometimes a section occurs at a short distance down from the summit of the culm; spikelets one- to several-flowered, in two rows on one side of each of several umbellately terminal, or occasionally axillary one-sided spikes or racemes; flowering glumes keeled, entire, toothed, or with one or three short straight arms.

352. *Cynodon dactylon* Pers. (*Cabriola* Kuntze.) Dog-tooth grass; Bermuda-grass. Planted successfully for a lawn in spots too hot for blue-grass to thrive.

353. *Spartina cynosuroides* Richard (1781). "Slough-grass"; Fresh-water Cord-grass. Sloughs and water holes, general; common. Aug. (ASU)

354. *Spartina polystachya* Pursh (1881). Saltmarsh Cord-grass. Wet saline lands, C. K.; frequent. Aug. (S)

355. *Spartina juncea* Psh. (1781). Rush-leaf Cord-grass. Saline meadows, central Kansas, frequent. Aug. (AS)

356. *Spartina gracilis* Trin. Inland Cord-grass. Saline meadows, S. W. K.; occasional. Aug. (AS)

357. *Chloris verticillata* Nutt. Prairie Windmill-grass. Low damp to dry saline prairies, middle and southwestern Kansas; common. May. (ASU)

358. *Chloris elegans* H. B. K. White Windmill-grass. To be looked for in dry alkaline prairie soils, extreme S. W. K. June. (A)

359. *Gymnopogon ambiguus* B. S. P. (Britton, Sterns and Poggenburg). (*G. racemosa* Beauv.) Naked-beard-grass. Dry sandy soil, Chautauqua county; not common. August. (ASU)

360. *Schedonnardus paniculatus* Trelease. (*Lepturus* Nutt.) Tumble-grass. Common in dry fields anywhere. Aug. (ASU) Heaps up high against hedges, fences, and other obstructions in the fall.

361. *Bouteloua hirsuta* Lagasca. Hairy Mesquit; Black Grama. Dry sandy loam, occasional in E. K.; frequent in west. July. (ASU)

362. *Bouteloua gracilis* Lag. (*B. oligostachya* Torr.) Blue Grama; Dainty Mesquit. Dry prairies of S. W. K., in sheltered situations. July. (ASU) Similar to *B. curtipendula*, but smaller, finer, and more delicate.

363. *Bouteloua curtipendula* Torr. (*B. racemosa* Lag.) Side-oats Grama; Tall Mesquit. Damp grounds, general; frequent or common. July. (ASU)

364. *Beckmannia erucæformis* Host. Slough-grass. Cheyenne and Sherman counties; frequent. July. (ASU)

365. *Eleusine indica* Gaertner. Large Crab-grass; Crowfoot-grass. Fields and cities, E. K.; becoming very common; likely to become a pest. June. Introduced.

366. *Leptochloa mucronata* Kth. Northern Slender-grass. Dry or moist soil, N. E. and C. K.; not common. July. (ASU)

367. *Leptochloa filiformis* (Lam.) Beauv. Sharp-scaled Slender-grass. Fields and sandy river bottoms, E. K.; rare.

368. *Buchloe dactyloides* Eng. Buffalo-grass. Dry prairies, W. K.; once common and universal; now entirely wanting in the eastern part of the state, and rapidly disappearing everywhere by being crowded out by

grasses that never could endure the constant trampling by buffalo, the annual fires, and the oft-recurring and continued drouths. June. (ASU) The provision possessed by this grass for withstanding long-continued drouth is one of the remarkable features told of these plants of the semiarid region. It has been recorded (see Transactions Kan. Acad. Sci., vol. vii, 1879-'80, page 53) that the roots of this lowly little buffalo-grass, seldom over four inches high, on the high mesas and prairie lands near the ninety-ninth meridian, sends its roots down fully fifteen feet into the dry, solid earth, and, while not on the highlands reaching the stratum of perpetual moisture, yet was able to reach a stratum of sufficient moisture—a stratum seldom affected by summer heat.

Tribe *i. Festuceæ*. Meadow-grass Tribe. Inflorescence paniculate or racemose, the panicles open or dense and spikelike; spikelets pedicellate, two- to many-flowered, usually perfect; flowering glumes longer than the empty glumes, awnless, or with one to several short, straight awns either terminal or borne just below the apex.

369. *Pappophorum apertum* Munro. Brush-grass. Dry plains, Meade to Morton county (Kellerman). Aug. (A)

370. *Gynierium argenteum* Nees. Pampas-grass. A splendid grass, occasionally in cultivation for winter boquets.

371. *Arundo donax* L. Giant Reed-grass. Tall, striking grasses, occasionally cultivated in water, both with and without variegated foliage.

372. *Phragmites communis* Trin. Reed. Swampy spots along streams, general; rare. Aug. (ASU)

373. *Munroa squarrosa* Torr. Stiff Thistle-grass. Dry soils, W. K.; a harsh, prickly annual grass, occasional on broken prairies. Aug. (ASU)

374. *Triodia flava* (L.) (*Poa flava* L.; *Triodia cuprea* Jacq.; *Tricuspis quinquefida* Beauv.; *Sieglingia seslerioides* Scribn.; *Tridens flavus* Hitchc.) Tall Purpletop. Damp, sandy fields, E. to C. K.; frequent. July-Sept. (ASU) This handsome grass has had to bear the burden of too many doctors officiating at its christening, some of whom came uninvited. Only the principal ones are named here.

375. *Triodia stricta* Vasey. (*Windsoria* Nutt.) Spicate Purpletop. Moist soil, Cherokee and Labette counties; occasional. July. (A)

376. *Triodia acuminata* Vasey. (*Tricuspis* Munro.) White Tuft-grass. Dry soils, W. K.; occasional. June. (S)

377. *Triodia elongata* Scribn. (*Uralepis* Buckl.) Wiry Purpletop. To be looked for on the dry plains of S. W. K.; it approaches quite close in Colorado and northern Texas. June-Aug.

378. *Triodia pilosa* (Buckl.) (*Uralepis* Buckl.) Hairy Purpletop. Dry soil, S. W. K.; occasional. Summer. (S)

379. *Triodia albescens* Vasey. (*Rhombolytrum* Nash). Whitish Purpletop. Reported from southwest Kansas.

380. *Triodia purpurea* (Walt.) (*Triplasis* Chapm.) Purpletop (Sand-grass). Sandy river bottoms and damp sands, E. and S. K.; not common. Aug. (ASU)

381. *Redfieldia flexuosa* Vasey. Blowout-grass. Plains and sandhills, especially in blow-outs, Finney to Morton counties; frequent. Aug. (ASU)

382. *Diplachne fascicularis* Beauv. Salt-meadow Feather-grass. Brackish marshes, scattered throughout the middle part of the state. Aug. (S)

383. *Diplachne acuminata* Nash. Sharp-scaled Feather-grass. Wet or moist soil; general; rare. Aug.

384. *Diplachne imbricata* Scribn. Shingled Feather-grass. To be looked for in S. W. K.; is found not far away in S. E. Colorado and Texas Panhandle.

385. (*Diplachne rigida* Vasey = *Eragrostis sessilispica* Buckl., *q. v.*)

386. *Eragrostis capillaris* Nees. Soft Lace-grass. Dry places, E. K.; not common. Aug. (ASU)

387. *Eragrostis frankii* Steud. Short-stalked Meadow-grass. Moist, sandy ground, N. E. K.; not common. Sept. (ASU)

388. *Eragrostis pilosa* Beauv. Tufted Meadow-grass. Fields and waste places, E. K.; not common. Introduced from the east.

390. *Eragrostis purshii* Schrader. Southern Meadow-grass. Dry places, E. K.; common. Aug. (ASU)

391. *Eragrostis poæoides* Beauv. (*E. minor* Host.) Low Meadow-grass; Small Love-grass. Waste sandy places, general; common. Aug. (ASU)

392. *Eragrostis major* Host. Stink-grass; Mule-candy; Great Love-grass. Waste sandy and cultivated lands, general; common. Aug. (ASU)

393. *Eragrostis sessilispica* Buckley. (*Diplachne rigida* Vasey.) Stiff Meadow-grass. Prairies, S. W. K.; occasional. Aug. (ASU) Spikelets appressed.

394. *Eragrostis curtipedicellata* Buckl. Short-pediceled *Eragrostis*. Prairies, Clark county west and north to Hamilton; occasional. Aug. (ASU)

395. *Eragrostis pectinacea* Steud. Purple Meadow-grass. Dry soil, E. and C. K.; common. Aug. (ASU)

396. *Eragrostis trichodes* Nash. Hair-like Love-grass. Dry sands, C. K., from Washington county to Barber; common. Aug. (ASU)

397. *Eragrostis secundiflora* Presl. (*E. oxylepis* Torr.) Purple Love-grass; Cluster-top Meadow-grass. Dry soil, S. W. K.; frequent. Aug. (S)

398. *Eragrostis hypnoides* B. S. P. (*E. reptans* Nees.) Creeping Low-grass. Sandy or gravelly shores, E. K.; common. Aug. (ASU)

399. *Eragrostis capitata* Nash. Big-head Low-grass. Wet sands in river beds, E. K.; frequent, though not common. July. (S) Lives like *E. hypnoides*; looks a little like *E. secundiflora*.

400. *Melica mutica* Walt. Honey-grass; Narrow Melic-grass. Open, rocky woods, N. E. K.; occasional. June.

401. *Melica nitens* Nutt. Tall Melic-grass. Dry, rocky woods and thickets, E. K.; 8-12 dm. high; not common. May. (AS)

402. *Melica porteri* Scribn. Small Melic-grass. Prairies, S. W. K.; 4-7 dm. high; rare. May. (AS)

403. *Diarrhena diandra* Wood. Twin-grass. Rich woods and shaded banks, E. K.; frequent. August. (ASU)

404. *Distichlis spicata* Greene. (*Uniola* L.) Alkali-grass; Salt-marsh Spike-grass. Dry or damp saline or alkaline meadows, N., C., S., and S. W. Kansas; very common. June. (ASU) Stolons from this grass root freely on fresh moist alkaline earth, where it can root at every point; on such occasions they may become thirty feet in length, and are occasionally exhibited at county fairs, as at Hutchinson.

405. *Uniola latifolia* Mx. Broad-leaf Spike-grass. Shaded, high earthy creek banks and rocky woods, E. K.; frequent. August. (ASU)

406. *Briza media* L. Quaking-grass. Occasional, in gardens.

407. *Briza maxima* L. Large Quaking-grass. Cultivated for its beauty.

408. *Dactylis glomerata* L. Orchard-grass. Introduced for good grass crops; escapes and grows naturally in rather moist soils.

409. *Cynosurus cristatus* L. Dogtail-grass. Street parks of the cities of E. K., and other waste places; introduced as adulteration in seeds of other grasses; rare. June.

410. *Poa annua* L. Annual Bluegrass; Low Spear-grass. Waste places and cultivated fields, E. K.; traveling westward. May. (ASU)

411. *Poa compressa* L. Flat-stem Bluegrass. Damp places on prairies and in fields, nearly all over Kansas; apparently native, having been here before settlement; yet not common. June. (ASU) Makes a very compact sod; foliage deep blue-green; lives in spots too hot for Kentucky bluegrass.

412. *Poa triflora* Gilibert. (*P. serotina* Ehrh.) Fowl-meadow Bluegrass. Wet meadows, eastern two-thirds of the state; common. July. (ASU)

(For *Poa flava* L. see *Triodia flava*, ante, No. 374.)

413. *Poa pratensis* L. Bluegrass; Kentucky Bluegrass. On rich limy soils where slightly shaded during the hottest days of summer. May-June. Introduced, but not yet thoroughly naturalized, except perhaps in shade of hills, tall trees, and buildings. Should be but sparingly mowed in heat of summer. Too close mowing of lawns during the drier weeks of July and August exposes the roots of this grass to the hot sunshine and either kills it outright or so weakens it that the crab-grasses and pigeon-grasses choke it to death later.

414. *Poa trivialis* L. Rough Bluegrass. Meadows and waste places, Brown and other counties of N. E. K.; not naturalized. June.

415. *Poa sylvestris* Gray. Sylvan Spear-grass. Wooded meadows, Douglas county eastward; not common. June. (SU)

416. *Poa autumnalis* Muhl. Spring Spear-grass. Woods, extreme eastern Kansas; not common. March-April. Wonder if identification of this grass is correct?

417. *Poa alsodes* Gray. Grove Spear-grass. Thickets along streams, E. K.; frequent. May. (ASU)

418. *Poa wolffii* Scribn. Silky Bluegrass. Dry soils, E. K.; occasional. May. (A)

419. *Poa arachnifera* Torr. Texas Bluegrass. Cultivated occasionally for pasture in S. W. K.; with its strong perennial rootstocks, well adapted to hot dry lands of summer, it makes a more reliable pasture or lawn than our Kentucky bluegrass, *P. pratensis*. May. (S)

420. *Poa arida* Vasey. (Heretofore listed as *P. andina* Nutt. by error.) Prairie Spear-grass. Bottom lands, Dickinson county, northward and westward; not common. July. (AS)

421. *Poa buckleyana* Nash. Bench-land Spear-grass. Dry soil, Cheyenne county; not common. July.

422. *Glyceria canadensis* Trin. Manna-grass. Marshes, E. K.; not common. July. (ASU)

423. *Glyceria nervata* Trin. Ribbed Manna-grass. Wet places, E. K.; common. June. (ASU)

424. *Glyceria Americana* (Torr.) Great Manna-grass. Wet lands, E. K.; frequent. June. (ASU)

425. *Glyceria fluitans* R. Br. Floating Manna-grass. Water or wet places, E. K.; occasional. July. (ASU)

426. *Puccinellia distans* Parlatores. Spreading Goose-grass. Salt meadows, C. K.; occasional. July.

427. *Puccinellia airoides* Wats. & Coult. Slender Goose-grass. Saline soil, C. K.; occasional. July. (S)

428. *Festuca octoflora* Walt. (*F. tenella* Pursh.) Slender Fescue-grass. Dry sandy and sterile soil, western part of the state; frequent. June. (ASU)

429. *Festuca ovina* L. Sheep Fescue. Limy soils in fields and waste places, E. K.; infrequent. June. (ASU)

430. *Festuca duriuscula* L. Hard Fescue. Waste places, E. K.; rather frequent. June. (ASU)

431. *Festuca pratensis* Hudson. Meadow Fescue; "Randall Grass." Heavy clay and gumbo soils, E. K.; raised as a crop. It is on record that the territory from Johnson west to Butler and from Marshall south to Wilson county raises 75 per cent of all the fescue-grass seed and hay in the United States.

432. *Festuca elatior* L. Tall Fescue. Raised in the same territory and is a more profitable crop always, as the grass is said to be rust-free.

433. *Festuca shortii* Kth. Woodland Fescue. Thickets, N. E. K.; frequent. July.

434. *Festuca nutans* Willd. Nodding Fescue. Rocky woods, N. E. K.; not common. June. (AS)

435. *Bromus inermis* Leyss. Smooth Brome-grass; Hungarian Brome. Introduced first on government farm at Garden City and farms generally over the state; does best in eastern part. Not yet a pest and may not become so.

436. *Bromus secalinus* L. Chess. Escapes from wheat fields for a year or so; neither common nor troublesome. June.

437. *Bromus ciliatus* L. Fringed Brome-grass; Wood Chess. Woods and thickets, E. K.; as far west as Great Bend and Smith Center. July. (ASU)

438. *Bromus rubens* L. Reddish Brome-grass. Introduced into America from Mediterranean coast, and reported by Professor Beal as being found in Kansas.

439. *Bromus purgans* L. Cathartic Chess. Thickets, E. K.; frequent. July. (S)

440. *Bromus incanus* Hitchc. Hoary Chess. Wooded hills, E. K.; rare.

441. *Bromus porteri* Nash. Silky Chess. Norton county, north and west; not common. July. (S)

442. *Bromus hordeaceus* L. Soft Chess. Waste places, E. K., not often seen. July.

443. *Bromus racemosus* L. Upright Chess. Waste places, E. K.; introduced. June.

444. *Bromus japonicus* Thunberg. Japanese Chess. Introduced in fescue-grass seed and has become established along hedge rows and in fence corners, etc.

Tribe *k. Hordeæ*. Rye-grass Tribe. Inflorescence in an equilateral terminal spike; spikelets several-flowered, dorsally compressed, uppermost imperfect, sessile and articulating alternately on opposite sides of a flat articulated zigzag rachis.

445. *Lolium perenne* L. Smooth Darnel; Perennial Ray-grass. Street parks in cities and other waste places; frequent. July.

446. *Lolium temulentum* L. Bearded Darnel; Poison Ray-grass. Waste places in fields, E. K.; reported from several places, though quite rare.

447. *Agropyron repens* Beauv. (*Triticum* L.) Creeping Wheat-grass; Quack-grass. Waste places, E. K.; occasional. July. Introduced from Europe.

448. *Agropyron pseudorepens* Scribn. & Sm. Rough Wheat-grass; Couch-grass. Waste places in dry fields, general, though commoner in W. K. July. (ASU)

449. *Agropyron occidentale* Scribn. (*A. glaucum occidentale* Vas. & Scribn.) Colorado Blue-joint; Western wheat-grass. Broken ground on prairies, hedgerows, and waste places in fields; generally over the state, though more frequent westward; not common eastward. July. (ASU)

450. *Agropyron tenerum* Vasey. Slender Wheat-grass. Dry prairies, W. K.; frequent. July. (ASU)

451. *Agropyron caninum* R. & S. (*Triticum* L.) Bearded Wheat-grass. In waste lands, N. E. K.; rare. July. (A)

452. *Triticum sativum* Lam. Wheat, including many subspecies, races and varieties, such as *T. vulgare* Vill., covering the Linnæan species *T. æstivum*, Spring, and *T. hybernum*, Winter Wheat, both smooth and bearded; *T. compactum*, "Dwarf" and "Hedgehog" Wheat; *T. turgidum* L., Soft English Wheat; and *T. durum* Desf., Flint Wheat. Along railroads, old wheat fields, etc.; seldom self-sows a second time from scattered grain.

453. *Triticum dicoccum* Schrank. Emmer; Rice-spelt. Numerous varieties, always awned. Sparingly grown as a crop at several points in C. and W. K.

454. *Triticum spelta* L. Spelt. Varieties, both awned and awnless, raised to some extent as a crop in Kansas.

455. *Secale cereale* L. Rye. Frequently self-sows a second time; yet does not become naturalized.

456. *Hordeum nodosum* L. Meadow Barley. Meadows and waste places, general. Quite common. June. (ASU)

457. *Hordeum pusillum* Nutt. Little Barley. Dry soil, general; common. June. (ASU)

458. *Hordeum jubatum* L. Squirreltail-grass. Dry soil, general; common in well-drained spots. July. (ASU)

459. *Hordeum sativum* Jessen. Barley, in several subspecies and varieties. Escapes from cultivation very rarely.

460. *Elymus striatus* Willd. Slender Wild-rye. Woods and banks, quite general; frequent in E. K.; occasional in W. K. June. (ASU)

461. *Elymus virginicus* L. Wild-rye. Moist soil along streams, general; common. July. (ASU)

462. *Elymus submuticus* (Hook.) Beardless Wild-rye. Shades, near water, E. and N. K.; frequent. July. (S)

463. *Elymus canadensis* L. Nodding Wild-rye; Canada Lyme-grass. Sandy soil, low ground, general; very common. July. (ASU)

464. *Elymus brachystachys* Scribn. & Ball. Short-spike Wild-rye. Moist open or shaded ground, N. and N. W. K.; frequent. Aug. (S)

465. *Elymus robustus* Scribn. & Sm. Stout Wild-rye. Low grounds, E. K.; frequent. Aug.

466. *Elymus glaucus* Buckl. Smooth Wild-rye. Moist soil, S. and S. W. Kansas; occasional. July. (S)

467. *Elymus condensatus* Presl. Rough Lyme-grass. Saline soils, C. and S. K.; frequent. July.

468. *Sitanion elymoides* Raf. Wild-rye Bristle-grass. Dry soil, W. K.; common. July. (ASU)

469. *Sitanion longifolium* J. G. Sm. Long-leaf Bristle-grass. Dry soils, C. to N. W. Kansas; occasional. July. (S)

470. *Hystrix patula* Moench. Bottle-brush-grass; Hedgehog-grass. Dry rocky woods, E. K.; frequent. June. (ASU)

Family 34. BAMBUSACEÆ. Bamboo Family.

Tree-like perennial grasses with woody culms. Foliage leaves rather broad, parallel-nerved, usually articulating with the sheath, with or without a petiole, often deciduous. Inflorescence paniculate or racemose, terminal or axillary, usually arranged in tufts or partial whorls at the nodes of the branches of the panicle. Spikelets three- to ten-flowered, rarely fewer; empty scales of involucre two to several, unequal, shorter than the glumes; flowering glumes many-nerved, awnless; paleæ two- to many-nerved; lodicules 3, remarkably large; stamens 3-6; styles 2-3, often grown together at the base. Fruit a free caryopsis, a caryopsis with a delicate pericarp, a nut with a thick free pericarp, or a berry.

471. *Arundinaria tecta* Muhl. Small Cane. Some small attempts are being made to introduce it into the swamps of southeastern Kansas, even near Topeka.

472. *Bambusa arundinacea* Retz. Cane Bamboo. Occasional in parks, etc.

ORDER XVII. CYPERALES. THE SEDGES.

Inflorescence clustered at the summit, in umbelloid, corymbose, cymose, or spicate panicles. Involucre of one to several large leaf-like bracts; involucrels none, or of one to several minute scales. Flowers in two-edged, glumaceous, one- to many-flowered spikelets, one flower, rarely two, in the axil of each scale. Perianth hypogynous, of one to twelve or more, usually six, chaffy segments or bristles, or none. Androecium of one to three stamens, usually three, with anthers bisporangiate. Gynœcium of a single carpel; style one- two- or three-cleft, rarely two-toothed or entire. Ovulary unilocular, sessile or stipitate. Ovule one, erect, anatropous; fruit an achene, lenticular or plano-convex, trigonous when style is three-cleft; embryo minute; albumen floury.

Grass-like or rush-like annuals or perennial herbs, usually growing in or near water. Stems (culms) jointless, slender, solid, rarely hollow, normally triangular or even triquetrous, sometimes quadrangular, flattened, or terete.

Laminodia three-ranked; blades narrow, strongly carinate, and folded over an angle of the stem; sheath at base closed, edges united, enfolding the stem.

Family 35. CYPERACEÆ. Sedge Family.

Flowers all perfect; rarely with stamens or pistil undeveloped; spikelets few- to many-flowered; involucre scales one or more. Perianth consists of one to six hypogynous scales or bristles or hairs, or is entirely wanting.

473. *Cyperus flavescens* L. Yellow Sedge. Low ground, N. E. K.; 1-3 dm. high; not common. August. (A)

474. *Cyperus diandrus* Torr. Low Sedge. Marshy places, general; 1-3 dm. high; common. August. (AS)

475. *Cyperus inflexus* Muhl. Elm-odored Sedge. Sandy alkaline prairies, general; about 1 dm. high; frequent to common in spots. June. (ASU)

476. *Cyperus pseudovegetus* Steudel. Marsh Sedge. Marshes, S. E. K.; 3-12 dm. high; not common. July. (AS)

477. *Cyperus acuminatus* Torrey & Hooker. Pointed Cyperus. Moist soil, general; 1-4 dm. high; common. July. (ASU)

478. *Cyperus rotundus* L. Nut-grass; Nut-sedge. Sandy fields, E. K.; 2-6 dm. high; not common. July. (ASU)

479. *Cyperus hallii* Britton. Big-top Nut-sedge. Fields, S. K.; 5-9 dm.; frequent. July. (AS)

480. *Cyperus esculentus* L. Yellow Nut-sedge; Chufa. Sandy prairies and fields, general; 3-8 dm. tall; common. Aug. (ASU)

481. *Cyperus erythrorhizos* Muhlenberg. Red-root Umbrella-sedge. Wet soil, E. K.; 2-6 dm. high; frequent. Aug. (ASU)

482. *Cyperus speciosus* Vahl. Showy Umbrella-sedge. Marshes, tufted, 1-4 dm. tall; common. July. (ASU)

483. *Cyperus ferruginescens* Boeckeler. Rusty Umbrella-sedge. Marshes, S. E. K.; frequent. Aug. (S)

484. *Cyperus ferax* Richard. Coarse Umbrella-sedge. Wet soil, E. to C. K.; 3-8 dm. high; common. July. (ASU)

485. *Cyperus strigosus* L. Straw-colored Umbrella-grass. Moist meadows, general; 3-8 dm.; occasional. July. (ASU)

486. *Cyperus ovularis* Torr. Pompon Umbrella-grass. Dry hills, N. E. K.; 2-4 dm.; common. July. (AS)

487. *Cyperus filiculmis* Vahl. Slender Umbrella-grass. Dry hills and fields, general; 5-12 dm.; common. June. (AS)

488. *Cyperus houghtoni* Torr. Pale-brown Umbrella-grass. Dry sandy soil, C. K.; 3-6 dm.; common. July. (AS)

489. *Cyperus echinatus* Wood. Hedgehog Umbrella-grass. Rich sandy soil, E. K.; 2-5 dm.; common. July. (ASU)

490. *Kyllinga pumila* Mx. Low Bur-sedge. Moist soil, E. K.; 1-3 dm.; rare. Aug. (ASU)

491. *Dulichium arundinaceum* Britt. (*D. spathaceum* Pers.) Reed-sedge. Wet places, E. K.; 3-10 dm.; occasional. August. (AS)

492. *Eleocharis quadrangulata* Roemer & Schultes. Square Spike-rush. Shallow water, Cherokee county, 6-12 dm. tall; not common. July. (ASU)

493. *Eleocharis atropurpurea* Kunth. Little Purple Wire-sedge. Wet sands, C. and S. K.; less than 1 dm. high; frequent in certain spots. August. (S)

494. *Eleocharis capitata* R. Br. Capitate Wire-sedge. Moist sandy soil, S. and E. K.; 1-2 dm. high; not common. July. (S)
495. *Eleocharis obtusa* Schultes. Ovoid Wire-sedge. Wet soil, E. K.; 1-5 dm.; common. July. (S)
496. *Eleocharis engelmannii* Steudel. Conical Wire-sedge. Wet soil, S. E. K.; 1-5 dm. high; common. August. (S)
497. *Eleocharis palustris* R. & S. Pipe-organ Spike-rush. Marshes and wet soils, general; 4-12 dm. high; common. August. (S)
498. *Eleocharis acicularis* R. and S. Needle Wire-grass. Wet soil, E. K.; $\frac{1}{2}$ -2 dm.; common. May. (S)
499. *Eleocharis tenuis* Schult. Slender Wire-grass. Wet soil, E. K.; 2-4 dm. high; frequent. May. (S)
500. *Eleocharis acuminata* Nees. (*E. compressa* Sullivant.) Flattish Wire-grass. Wet soil, N. K.; 2-5 dm. high; frequent. June. (S)
501. *Eleocharis intermedia* Schult. Matted Wire-grass. Marshes, E. to C. K.; 1-4 dm. long; common. July. (S)
502. *Eleocharis rostellata* Torr. Beaked Spike-rush. Marshes and alkaline meadows, E. to C. K.; 4-12 dm.; common. August. (S)
503. *Fimbristylis capillaris* Gray. Hair-like Fringe-rush. Dry or moist soil, E. to C. K.; 1-3 dm. tall; common. July. (S)
504. *Fimbristylis spadicea* Vahl. Fringe-rush. Marshes and brackish shores, general; 3-7 dm. high; frequent. Aug. (S)
505. *Fimbristylis castanea* Vahl. Marsh Fringe-rush. Salt marshes and wet sands, general; 2-5 dm.; common. July. (S)
506. *Fimbristylis vahlii* Link. Bird-nest Fringe-rush. Moist sands, S. E. K.; less than 1 dm. high; not common. Aug.
507. *Scirpus nanus* Sprengel. Dwarf Club-rush. Near salt springs and muddy spots in edge of salt marshes, C. K., N. to S.; $\frac{1}{2}$ dm. or less; frequent. July. (S)
508. *Scirpus hallii* Gray. Black-seed Club-rush. Wet soil, Norton county; 1-3 dm. high; not common. July. (S)
509. *Scirpus americanus* Persoon. (*S. pungens* Vahl.) Chair-maker Club-rush. Fresh or brackish waters, general; 4-12 dm. high; common. June. (A S)
510. *Scirpus olneyi* Gray. Sharp-angle Bulrush. Salt marshes, C. K. and westward; 6-18 dm. high; not common. June. (S)
511. *Scirpus validus* Vahl. Great Bulrush. Water, up to two feet deep, general throughout the state; 8-24 dm. high; common. June. (ASU)
512. *Scirpus interior* Britt. Prairie Bulrush. Wet prairies, general; 3-5 dm. high; not common. June. (AS)
513. *Scirpus robustus* Pursh. Salt-marsh Bulrush. Salt marshes, C. K.; 6-13 dm. high; common. July. (ASU)
514. *Scirpus fluviatilis* Gray. River Bulrush. Shallow water along streams, pretty general over the state; 7-16 dm. high; common. June. (ASU) Prof. D. E. Lantz says the tubers of this plant constitute the principal winter food of the muskrat in many localities.
515. *Scirpus pallidus* Fernald. Pale-green Bulrush. Water, N. and E. K.; 6-12 dm.; common. June. (ASU)
516. *Scirpus polyphyllus* Vahl. Leafy Bulrush. Swamps, wet woods, and borders of still waters, E. K.; 4-11 dm. high; common. July. (ASU)

517. *Eriophorum lineatus* Bentham & Hooker. Reddish Wool-rush. Swamps and wet meadows, E. K.; 3-10 dm.; common. June. (AS)
518. *Eriophorum cyperinus* L. Wool-rush. Swamps and wet meadows, E. K.; 6-18 dm. high; not common. Aug.
519. *Eriophorum virginicum* L. Virginia Wool-rush; "Cotton-grass." Bogs, Finney county; 5-dm.; abundant. June. (S)
520. *Fuirena simplex* Vahl. Western Bog-sedge. Moist soil, C. K.; 1-4 dm. high; common. June. (S)
521. *Hemicarpha micrantha* Pax. (*H. subsquarrosa* Nees.) Single-chaff Bog-sedge. Moist sandy soil, N. E. K.; 1 dm. or less; rare. July. (S)
522. *Hemicarpha aristulata* (Cov.) Beardy Bog-sedge. Moist soil, E. K.; about 1 dm. or less; frequent. July. (S)
523. *Hemicarpha drummondii* Nees. Compact Bog-sedge. Damp sand, S. E. K.; 0.5 to 1.3 dm. high; not common. July. (A)
524. *Rhynchospora corniculata* Gray. Horned Beak-rush; Beak-sedge. Swampy spots along rivers, general; 10-20 dm. tall; common. July. (ASU)
525. *Rhynchospora macrostachya* Torr. Great Beak-rush. Swampy spots along Kansas and Arkansas rivers to southern Kansas; 10-25 dm. high; not so common. July. (ASU)
526. *Rhynchospora alba* Vahl. White Beak-rush. Permanently wet grounds, E. K.; 2-4 dm. high; not common. July. (ASU)
527. *Rhynchospora glomerata* Vahl. Clustered Beak-rush. Moist soils, E. K.; 3-10 dm. high; frequent. July. (ASU)
528. *Rhynchospora cymosa* Elliott. Grass-like Beak-rush. Moist soils, E. K.; 3-5 dm. high; not common. June.
529. *Cladium mariscoides* Torr. Twig-rush. Marshes, fresh or brackish, E. K.; 4-10 dm.; common. July. (ASU)

Family 36. CARICACEÆ. Carex Family.

Flowers unisexual, monoecious or dioecious. Perianth of staminate flowers none; stamens three, guarded by a small dorsal bract in lieu of a perianth; filaments slender; anthers bisporangiate. Perianth of carpellate flowers of two glumaceous bracts almost ventrally placed, closely united to their summits, ventrally and remotely united to their summits dorsally, thus forming a trigonous utricle called a *perigynium*, within which the seed is perfected; dorsal bract missing. Inner whorl of perianth consists merely of a few bristles or hairs, or is entirely wanting.

530. *Scleria triglomerata* Michaux. Tall Nut-rush. Sandy meadows and thickets, S. E. K.; 4-9 dm.; frequent. June. (AS)
531. *Scleria pauciflora* Muhl. Papillose Nut-rush. Dry sandy soils, S. E. K.; 2-5 dm.; frequent. June. (AS)
532. *Scleria kansana* Fernald. Kansas Nut-rush. Sandy soil, Cherokee county; achenes tuberculated. (A)
533. *Carex lupulina* Muhl. Hop-sedge. Ditches, Wyandotte and Labette counties; 4-9 dm.; occasional. June. (A)
534. *Carex gigantea* Rudge. Great Hop-sedge. Wet meadows, E. K., local; 5-12 dm. July.
535. *Carex utriculata* Boott. Bottle-sedge. Marshes, E. K.; 6-10 dm. June. (S)
536. *Carex monile* Tuckerman. Necklace Carex. Wet meadows, E. K.; 5-10 dm. June. (S)

537. *Carex lurida* Wahlenberg. Dirty-brown Carex. Wet meadows, general; 5-10 dm. June. (S)
538. *Carex hystrix* Muhlb. Porcupine Carex. Low meadows and swales, N. and N. E. K.; 3-7 dm. June. (AS)
539. *Carex squarrosa* L. Squarrose Carex. Swamps, E. K.; 6-9 dm. June. (AS)
540. *Carex frankii* Kunth. (*C. stenolepis* Torr.) Narrow-scale Carex. Wet meadows, E. K.; 3-8 dm. June. (AS)
541. *Carex trichocarpa* Muhlb. Hairy-fruit Carex. Wet meadows, N. E. K.; 9-12 dm. June. (AS) Includes var. *Deweyi*.
542. *Carex aristata* R. Br. Awned Carex. Marshes, E. K.; 6-12 dm. June. (S)
543. *Carex riparia* Curtis. River-bank Carex. Wet shores, E. K.; 6-11 dm. May. (AS)
544. *Carex shortiana* Dewey. Turk-fez Carex. Wet meadows, E. K.; 4-9 dm. May. (AS)
545. *Carex lanuginosa* Mx. Woolly Carex. Wet meadows, general; 6-10 dm. June. (A)
546. *Carex kansana* (Britt.) Kansas Woolly Carex. Similar, but leaves very narrow and rough. Reported from Kansas by Doctor Britton.
547. *Carex stricta* Lamarck. Tussock Carex. Swamps, general; 5-12 dm. July. (AS)
548. *Carex nebraskensis* Dewey. Nebraska Carex. Sandy soil, N. W. K.; 4-8 dm. May. (S)
549. *Carex davisii* Schweinitz & Torrey. Long-awned Carex. Moist thickets, lower Kaw valley; 5-12 dm. May. (A)
550. *Carex castanea* Wahl. Chestnut Carex. Thickets, E. K.; 4-9 dm.; occasional. June. (S)
551. *Carex globosa* (Bailey). Globose Carex. Low woods and meadows, S. E. and S. K.; occasional. May. (S)
552. *Carex grisea* Wahl. Gray Carex. Woods and thickets, E. K.; 3-8 dm. May. (AS)
553. *Carex granularis* Muhlb. Meadow Carex. Moist meadows, E. K.; 2-8 dm.; occasional. May. (AS)
554. *Carex oligocarpa* Schkuhr. Small-top Carex. Dry woods, E. K.; 2-6 dm. May. (AS)
555. *Carex tetanica* Schk. Lock-jaw Carex. Wet meadows and woods, S. E. K.; 3-5 dm. May. (AS)
556. *Carex meadii* Dewey. Big Lock-jaw Carex. Swamps and wet meadows, E. K.; 3-7 dm. May. (AS)
557. *Carex laxiflora* Lam. Loose-flowered Carex. Meadows and thickets, E. K., or generally over the state; 2-6 dm. May. (AS)
558. *Carex platyphylla* Carey. Broad-leaf Carex. Rich woods, E. K.; 2-4 dm. May. (A)
559. *Carex setifolia* Britt. Bristly-leaf Carex. Dry sandy soil, on limestone rocks, W. K.; 1-4 dm. May. (AS)
560. *Carex pennsylvanica* Lam. Pennsylvania Carex. Dry soil, N. and W. K.; 2-4 dm. May. (AS)
561. *Carex varia* Muhlb. Tufted Carex. Dry soil, W. K.; 2-6 dm. April. (A)

562. *Carex umbellata* Schk. Umbeled Carex. Dry soil, S. E. and S. K.; 1-3 dm. April. (S)
563. *Carex filifolia* Nutt. Thread-leaf Carex. Dry soil, W. K.; 1-3 dm. May. (S)
564. *Carex stenophylla* Wahl. Rolled-leaf Carex. Dry soil, N. W. K.; 1-2 dm. June. (AS)
565. *Carex douglasii* Boott. Light-green Carex. Dry soil, N. W. K.; 1-3 dm. June. (S)
566. *Carex conjuncta* Boott. Soft Fox-sedge. Moist meadows, E. K.; 3-10 dm. (A)
567. *Carex stipitata* Muhl. Awl-fruit Fox-sedge. Wet meadows, E. K.; 3-10 dm. May. (A)
568. *Carex crus-corvi* Shuttleworth. Ravenfoot Fox-sedge. Swamps, E. K.; 6-12 dm. May. (AS)
569. *Carex marcida* Boott. Clustered Fox-sedge. Dry, chalky soil, N. W. K.; 3-6 dm. June. (S)
570. *Carex diandra* Schrank. Small-top Fox-sedge. Wet meadows, N. K.; 4-7 dm.; rare, apparently. May. (S)
571. *Carex grvida* Bailey. Heavy-top Fox-sedge. Thickets, E. K.; 5-10 dm.; occasional. May. (S)
572. *Carex vulpinoidea* Mx. Fox-sedge Carex. Wet meadows, general; 3-6 dm. June. (AS)
573. *Carex cephalophora* Muhl. Oval-head Carex. Dry fields and hills, S. E. K.; 3-6 dm. May. (A)
574. *Carex leavenworthii* Dewey. Orbicular Carex. Meadows, S. E. K., north and west to Topeka; 2-5 dm.; frequent. May. (S)
575. *Carex muhlenbergii* Schk. Ovoid Carex. Dry fields and sterile hills, general; 3-7 dm. May. (AS)
576. *Carex interior* Bailey. Inland Carex. Damp or wet soils, E. K.; 2-5 dm.; not common. June. (AS)
577. *Carex xerantica* Bailey. Silver-scale Carex. Open prairies, N. K.; 3-6 dm.; not common. July. (A)
578. *Carex tribuloides* Wahl. Blunt Broom-sedge. Meadows, E. K., west to Great Bend; 3-10 dm. July. (S)
579. *Carex scoparia* Schk. Pointed Broom-sedge. Moist soil, E. K., west to Council Grove; 2-6 dm.; not common. July. (S)
580. *Carex straminea* Willd. Straw-sedge. Dry fields, E. K.; 3-7 dm.; not common. June. (AS)
581. *Carex mirabilis* Dewey. Great Straw-sedge. Dry banks and rich copses, E. K.; 6-15 dm.; frequent in spots. (S)
582. *Carex festucea* Willd. Broad-wing Straw-sedge. Dry or moist soil, 4-12 dm.; general; common. May. (AS)
583. *Carex bicknellii* Britt. Smooth-wing Straw-sedge. Dry soil, E. K.; 6-10 dm.; rather common. June. (AS)

ORDER XVIII. JUNCALES. THE RUSHES.

Inflorescence compound or decompound, in umbelloid or corymbose, often one-sided, panicles, in the axil of a leafy bract. Perianth hexaphyllous, segments small, chaffy, or partly foliaceous; flowers are liliaceous in structure, glumaceous in aspect and texture.

Family 37. JUNCACEÆ. Rush Family.

Erect perennial, rarely annual, tufted, grass-like herbs, growing in water or wet places. Roots fibrous; stems jointless, terete, often hollow; though normally filled with spongy tissue, the large hollow places filled with septa and carrying much air. Leaves invariably without laminæ, transformed into laminodia typically terete and cellular, occasionally merely channelled on the upper surface, often dorsally compressed, without carinæ; sheaths with edges free and lapping; ligule none; leaves rarely reduced to phyllodia. Flowers small, actinomorphic, hypogynous, persistent, with or without prophylla (bractlets). Stamens three or six, in one or two whorls; anthers bisporangiate, adnate, introrse, dehiscent by a slit. Style single, short; stigmas three, filiform. Pistil superior, tricarpaceous; ovary trilobular, or unilobular by the placenta, which are parietal, not reaching the axis. Ovules three to many, ascending, anatropous. Fruit a three-valved, loculicidal capsule. Seeds three to many, small, cylindrical, with caruncular appendages. Embryo minute at base of fleshy albumen.

584. *Juncus effusus* L. Rush. Swales along the Arkansas river, Barton to Sedgwick county, and elsewhere; 2-13 dm. high; common. May. (S).

585. *Juncus bufonius* L. Toad Rush. Damp open ground, E. K.; 2 dm. high, branching low; common. June. (S)

586. *Juncus tenuis* Willdenow. Door-yard Rush. Tufted, 2-6 dm. high; very common in most places where somewhat tramped by people. June. (S)

587. *Juncus interior* Wiegand. Prairie Rush. Prairies, general; 4-9 dm.; not common. June. (S)

588. *Juncus dudleyi* Wieg. Auricled Rush. Damp calcareous soil, N. E. K.; 3-10 dm.; not common. June.

589. *Juncus littoralis* (Engelm.) Salt-marsh Rush. Saline marshy shores, Washington county to Stafford, and southwest; 3-12 dm.; frequent. June. (S)

590. *Juncus marginatus* Rostkova. Grass-rush. Moist sandy grassy places, E. K.; 2-7 dm. high from branching rootstocks; common. July. (S)

591. *Juncus aristulatus* Michaux. Bearded Grass-rush. Wet sandy soil, S. E. K.; 4-10 dm.; occasional. July. (S)

592. *Juncus setosus* (Coville.) Bristly Grass-rush. Similar situations, S. E. K.; with bristly-tipped acuminate perianth-segments and smaller seeds. Not common. July.

593. *Juncus torreyi* Cov. Pompon Rush. Damp sandy soil, C. and S. K.; 4-10 dm.; frequent. July. (S)

594. *Juncus brachycarpus* Eng. Short-fruit rush. Damp soil, S. E. K.; occasional.

595. *Juncus scirpoides* Lamarck. Bulrush-like Rush. Wet sandy soil, S. E. K.; 4-9 dm.; common. July. (AS)

596. *Juncus acuminatus* Mx. Sharp-seed Rush. Water, S. E. K.; 3-7 dm.; heads numerous; not common. May.

597. *Juncus robustus* Cov. Stout Rush. Water, S. E. K.; 5-11 dm.; heads very numerous and small. Not common. June. (A)

598. *Juncus diffusissimus* Buckley. Diffuse Rush. Wet grounds, S. E. K.; 2-6 dm.; heads numerous and small; frequent. June. (S)

599. *Luzula campestris* DeCandolle. Wood-rush. Woodlands, S. E. K.; 1-4 dm.; common. April. (S)

600. *Luzula bulbosa* (Wood). Bulbous Wood-rush. Woods, near streams, S. E. K.; 2-5 dm.; occasional. April. (S)

Subclass B. SPADICIFLORÆ. Jacks-in-Pulpit.

SPADIX-FLOWERED MONOCOTYLS.

Flowers crowded upon a fleshy spadix, or in a dense continuous or interrupted spike, or in an ovoid or globose head, often subtended by a foliaceous spathe, sometimes colored white or other than green. Perianth none, or what little there may be consisting of a few hairs or hyaline or chaffy scales free from the ovulary. Andrœcium normally of two to twelve stamens, in one or more whorls, three or fewer in each whorl, usually with very short filaments or none at all, and with bisporangiate anthers opening by pores or slits. Pollination anemophilous and hydrophilous. Gynœcium of numerous stipitate or sessile unilocular carpels, each ovulary with a single anatropous ovule.

ORDER XIX. ARALES. THE ARADS.

Inflorescence normally spadiceous and spathaceous. Flowers without a perianth, or perianth reduced to mere chaffy scales, but with the entire spadix protected by a spathe. Stamens two to ten, filaments short. Pistil tricarpellary, the ovulary in each carpel with two or more ovules.

Family 38. LEMNACEÆ. Duckweed Family.

Minute stemless and leafless floating herbs, reduced to mere thallus-like fronds, which multiply all summer by proliferous offsets from the edge or upper surface of the fronds. On approach of winter blossoming takes place, and hypnospermous seeds are formed, which sink to the bottom till warm weather next year; then they come to the surface, and multiply as before. Inflorescence reduced to three flowers, two of a single minute stamen having an anther with two to four sporanges each, the third an exceedingly simple carpel, the whole subtended by a minute scale-like spathe in a pit. Ovules two to several. Fruit a utricle containing a single seed with comparatively large endosperm. The smallest and simplest of flowering plants.

601. *Wolffia columbiana* Karsten. Columbian Frog-spit. Stagnant pools and shallow, permanent waters, E. K.; not common. Sept. Under the surface.

602. *Wolffia punctata* Grisebach. Dotted Frog-spit. Stagnant waters, E. K.; not common. Sept. (S) Floating on the surface.

603. *Wolffia papulifera* Thompson. Pimply Frog-spit. Still waters, Miami county (Mackenzie & Bush).

604. *Lemna gibba* L. Gibbous Duckweed. Ponds and slow streams, E. K.; frequent. Aug. (S)

605. *Lemna minor* L. Little Duckweed. Ponds and still waters, E. K.; occasional. Oct.

606. *Lemna perpusilla* Torr. Ovoid Duckweed. Ponds and lakes, E. and S. K.; common. Three-nerved. Sept. (S)

607. *Lemna minima* Philippi. Least Duckweed. Ponds, E. K.; not often seen, but sometimes in great abundance. Oct. (S)

608. *Spirodela polyrrhiza* Schleiden. Great Duckweed. Still waters, general; common, and at times very abundant. Oct. (ASU)

Family 39. ARACEÆ. Arum Family.

Plants arising from a large perennial corm, with very acrid sap caused by minute acicular crystals of calcium oxalate. Leaves with erect laterally compressed two-ranked laminodia with very deep carinæ and closely folded narrow wings, in *Acorus*; otherwise with petioles and broad laminæ of various forms, as ovate, simple or compound, peltate, cordate, auriculate, or hastate, all with netted venation and sheaths below the petioles, sometimes very short. Inflorescence of many minute naked six-parted or four-parted florets, closely crowded on a cylindrical spadix subtended by a conspicuous often highly colored spathe. Florets apparently perfect, in practice diœcious, as the stamens on one plant are suppressed, and on another the pistils, making the one practically carpellate and the other staminate. Fruit a berry. Seeds hypnospermous, with copious albumen and an axial embryo.

609. *Acorus calamus* L. Sweet-flag. Calamus. At a few places in eastern Kansas; but very little beyond where introduced. May. (ASU)

610. *Arisæma triphyllum* Torr. Jack-in-the-Pulpit. Indian Turnip. Rich soil in moist woods and thickets, E. K.; frequent. June. (ASU)

611. *Arisæma dracontium* Schott. Green-dragon, Dragon-root; Indian Turnip. Rich alluvial soils in woods and thickets, E. K.; common. May. (ASU)

612. *Amorphophallus giganteus* Blume. Giant Arum. From South Africa; occasional in gardens for the wonder of the plant.

613. *Caladium esculentum* L. (*Colocasias* Morandi). Caladium; Elephant-ear; frequent in gardens.

614. *Calla æthiopica* L. (type species, 1753). Calla. From Cape of Good Hope; frequent in house and garden culture. Later (1815) named *Richardia africana* by Kunth.

ORDER XX. PANDANALES. THE CATTAIL REEDS.

Inflorescence in a compact spadix, or more or less interrupted spike, subtended by a fugacious bract, at the summit of a naked or leafy stem, the staminate flowers above the carpellate. Androecium of two to six stamens, surrounded by numerous bristles or scales. Gynœcium of a single carpel or of two united carpels; ovulary unilocular, one-ovuled, one-seeded.

Family 40. TYPHACEÆ. Reed-mace or Cattail Family.

Aquatic perennial herbs, from perennial horizontal rootstocks, and with tall appressed dorso-ventrally compressed laminodia, in two ranks, alternating, with faces toward the central stem and without a keel. Carpellate flowers very numerous, minute, closely crowded into a compact cylindrical spike at the summit of a naked, wand-like, solid stem, standing high out of water. Staminate flowers in a smaller spike above the carpellate (on the same stem) and early deciduous. Perianth of several delicate silky clavate hairs. Fruit nutlike, minute, ellipsoid or clavate, stipitate. Embryo cylindric, straight, in abundant farinaceous endosperm.

615. *Typha latifolia* L. Cattail (flag). General throughout the state; frequent in watery places. June. (ASU)

616. *Typha angustifolia* L. Narrow-leaf Cattail. Reno county, along the Ninnescah, and elsewhere in southern Kansas; rare. June. (ASU)

Family 41. SPARGANIACEÆ. Bur-reed Family.

Aquatic herbs, with linear, two-ranked laminodia, and with monœcious flowers in dense serial globose clusters (interrupted spadices), axillary to leaf-like spathes. Several upper heads staminate; lower ones carpellate. Ovulary unilocular or bilocular; ovule one. Fruit nutlike, ovoid, or spindle-shaped.

617. *Sparganium eurycarpum* Engelm. Broad-fruit Bur-reed. Scattered, in wet places, throughout the state. May. (ASU)

618. *Sparganium androcladum* Morong. Branching Bur-reed. Scattered, in wet places. June. (ASU)

Family 42. PANDANACEÆ. Screw-pine Family.

Greenhouse plants of foreign origin. Several species are raised; only the commonest one is here listed.

620. *Pandanus elegans* Du Petit Thouars. Elegant Pandanus; Screw-pine. Frequent in house culture.

ORDER XXb. PALMALES.

A very extensive order of ligneous arborescent monocotyls, comprising many species, genera, and even families of tropical trees and shrubs of widely different characteristics, some of them of comparatively easy greenhouse culture, such as (621) *Phoenix dactylifera* L., the date-palm, of the family (42b) *Phœnicaceæ*; (622) *Cocos weddelliana* H. Wendland, a cocoa-palm, and (623) *Areca lutescens* Bory, a betelnut-palm, and (624) *Kentia forsteriana* Muell., a feather-palm, all three of the family (42c) *Cocacææ*; and (625) *Livistona humilis* R. Brown (*Latania borbonica* Hort.), Bourbon fan-palm, of the family (42d) *Sabalaceæ*, belong here. These are the best known; and some of them are often seen outside of conservatories.

ORDER XXI. NAIADALES. THE PONDWEEDS.

Inflorescence solitary or clustered in the leaf-axils, otherwise spirally arranged in a spike, or borne on a one-sided spadix, the spathe fugacious or disappearing early. Flowers perfect or unisexual, usually monœcious, the carpellate flowers often dimorphous. Perianth single, double, or none, glumaceous or hyaline, often imperfect. Androecium of one to four stamens, with very short filaments or none; anthers with one, two or four sporanges, and large strap-like or petaloid connectives. Gynœcium of one to several carpels, distinct or united; ovulary superior. Fruit nut-like or utricular.

Family 43. ZANNICHELLIACEÆ. Pondweed Family.

Perennial water-plants, with alternate or opposite leaves floating and submersed, and submerged laminodia, phyllodia, and stipules. Prolaminæ (blades) of floating leaves entire, of submersed leaves capillarily divided, both on the same plant or otherwise. Flowers in sessile or peduncled spikes (spadices), or in axillary clusters. Perianth very little; sometimes sepals four; but flowers usually enclosed in a fugacious hyaline spathe. Stamens one to four, filaments short; anthers extrorse, two to four sporangiate, the

connectives broad, petal-like. Carpels two to ten, usually four, distinct, one-seeded. Fruits drupe-like, seed nut-like; embryo coiled; endosperm none, or very little.

626. *Potamogeton natans* L. Floating Pondweed. Ponds, E. K. and elsewhere; frequent. July. (ASU)

627. *Potamogeton diversifolius* Rafinesque. (*P. hybridus* Mx.) Bristly Pondweed. Still waters, Cherokee and Wyandotte counties; rare. June. (ASU)

628. *Potamogeton spirillus* Tuckerman. Spiral-seed Pondweed. Ponds and ditches, Shawnee and Riley counties; frequent. June. (AS)

629. *Potamogeton amplifolius* Tuck. Large-leaf Pondweed. Lakes and ponds, E. K.; not common. July. (U).

630. *Potamogeton heterophyllus* Schreber. Variable Pondweed. Still water, scattered; infrequent. July. (S)

631. *Potamogeton lonchites* Tuck. Long-leaf Pondweed. Slow streams, W. K., and some of the eastern counties; frequent. July. (ASU)

632. *Potamogeton lucens* L. Shining Pondweed. Comanche county (Hitchcock). Sept. (A)

633. *Potamogeton obtusifolius* Mertens & Koch. Blunt-leaf Pondweed. Clay county (Hitchcock). July. (A)

634. *Potamogeton pusillus* L. Small Pondweed. Ponds and slow streams, Ellis county, north and west; frequent to common. July. (ASU)

635. *Potamogeton foliosus* Raf. Leafy Pondweed. Streams in C. K., from Phillips and Jewell counties south to Pratt; frequent. Sept. (AS)

636. *Potamogeton filiformis* Pers. Thread-leaf Pondweed. Water in calcareous regions, Mitchell county, south and west. Aug. (AU)

637. *Potamogeton pectinatus* L. Fennel-leaf Pondweed. Brackish waters, northern and central Kansas; occasional. July. (AS)

638. *Ruppia maritima* L. Ditch-grass. Saline waters, Stafford, Rice, Barton, Saline, and other counties of C. K.; frequent. July. (S)

639. *Ruppia occidentalis* Wats. Western Ditch-grass. To be found in saline waters of N. W. K. July.

640. *Zannichellia palustris* L. Horned Pondweed. Permanent brackish waters, C. K.; not common. July. (AS)

Family 44. NAIADACEÆ. Water-nymph Family.

Submerged herbs, with fibrous roots and slender branching knotty stems. Leaves (laminodia) opposite or verticillate, minutely serrulate, or thread-like, and with broad basal sheaths. Flowers unisexual, monœcious or diœcious, solitary in the axils, sessile or short-pedicel. Staminate flowers with a double perianth, the outer four-pointed, the inner hyaline; stamens one, sessile; anther unisporangiate. Carpellate flowers with a single one-ovuled ovary; style short; stigmas two or three, with subulate stigmatic processes between. Fruit an ellipsoid drupelet with a crustaceous straw-colored pericarp. Seed smooth or sculptured with many rows of minute tetragonal to hexagonal areolations. Embryo straight; endosperm none.

641. *Najas flexilis* Rostkof & Schmidt. Slender Water-nymph. Ponds and still waters, C. and W. K.; not common. June. (ASU)

642. *Najas guadalupensis* Morong. Guadalupe Water-nymph. Ponds and deep water-holes along the Prairie Dog and Republican rivers, N. W. K. (S)

CLASS X.* PETALIFERÆ. PETAL-BEARERS.

Monocotyls with Showy-colored Perianth.

Floral envelopes herbaceous, foliaceous, more or less colored, in two or more whorls surrounding the carpel, deciduous or partly persistent. Pollination principally entomophilous. Fruit mostly capsular; though it may be nuciform, follicular, utricular, or even bacciform.

Subclass C. ALISMÆFLORÆ. Water Plants.

ALISMA-FLOWERED MONOCOTYLS.

Perianth, when present, usually in two whorls, actinomorphic, heterochlamydeous, consisting of three persistent herbaceous green sepals and three deciduous chromoplastic highly colored petals. Androecium normally of six stamens, though they may be greater in number or fewer; filaments short; anthers with inconspicuous connectives. Gynoecium of three to many distinct carpels, sometimes coherent during anthesis; ovaries superior. Aquatic or marsh-inhabiting herbs, with various leaves, either with long petioles and broad laminæ or laminodia with their distal ends expanded into blade-like prolaminae; often reduced to phyllodia.

ORDER XXII. HYDRALES THE WATERWORTS.

Inflorescence spathaceous. Flowers arising from a spathe or involucre of one to three bracts. Perianth regular, with three herbaceous or petaloid sepals and three thin petals, or none. Stamens three, or a multiple of three, in one or more whorls, with distinct or partially united filaments. Pollination hydrophilous. Carpels 3 to 15, united, with as many parietal placentæ.

Family 45. VALLISNERIACEÆ. Tape-grass Family.

Submerged or floating water plants with perennial stolons. Leaves various, with linear grass-like submerged or floating laminodia and small one-nerved pellucid opposite or verticillate and minutely denticulate cauline leaves. Flowers monœcious, diœcious, and polygamous, rarely perfect, arising from an ovoid, obovoid, or tubular two-cleft spathe, with sepals and petals three each. Staminate flowers solitary, in threes, or numerous and crowded upon a sessile spadix, detaching at maturity and expanding on the surface of the water, to allow the dry pollen to float away to the stigmas; stamens on short filaments, in whorls of three or fewer, united at base into a column; anthers bisporangiate. Carpellate flowers solitary in the axils, but with a calyx-tube or a coiled scape just long enough to allow the flower to reach the surface and float on it for pollination; styles three to nine, short; stigmas, three, entire or two-cleft. Perfect flowers like the carpellate ones, but with three to nine stamens. Ovary unilocular, with three parietal placentæ, or with loculi six to nine; ovules numerous, borne all over the placental walls, anatropous or orthotropous. Fruit an indehiscent utricle, ripening under water; seeds with straight embryo; without endosperm.

643. *Philotria canadensis* Britton. (*Elodea* Mx) Ditch-moss. Fresh-water ponds and streams, Miami county. May. (U)

644. *Philotria minor* Small. Little Ditch-moss. Ponds and slow streams, S. E. K.; occasional. May. (AS)

645. *Vallisneria spiralis* L. Tape-grass. Quiet waters, Miami, McPherson, Rice, Reno and Pratt counties; not common. Aug. (ASU)

646. *Limnobium spongia* Rich. Frogbit. Stagnant water, Johnson county; rare, and only to be found in special years, when the weather is favorable.

ORDER XXIII. ALISMALES. THE ALISMADS.

Inflorescence in spikes, racemes, or panicles; flowers perfect or unisexual. Perianth single or double; calyx of three persistent herbaceous sepals, and corolla of three deciduous showy petals, or none. Stamens three, six or more, sessile or with very short filaments; anthers with inconspicuous connectives. Carpels three to many, distinct, though often coherent during anthesis; ovulary superior; style short; stigma discoid; ovules solitary or few. Fruit a head of achenes, or capsular. Hydrophytes, from rootstocks usually tuber-bearing; caulescent or scapose. Leaves basal, alternate, sheathing; forms various—laminar, laminodiar, phyllodiar, or bladeless, sometimes juncoïd, with spongy tissue; laminodia with their distal ends in all degrees of expansion, from not at all or only slightly, as in *Triglochin*, to a broad auriculate prolamina, closely simulating a true leaf blade, as in *Sagittaria*; nervation prominent, parallel, radiating, campylodromous, or convergent.

Family 46. SCHEUCHZERIAACEÆ. Arrow-grass Family.

Perennial marsh herbs, with semiterete rush-like or tapering bladeless laminodia, with expanded open sheaths. Flowers perfect, in spikes or racemes, without subtending bracts. Perianth in two series, the inner (corolla) deciduous. Stamens six; anthers sessile, bisporangiate, extrorse. Carpels three or six, unilocular, one- to two-ovuled, somewhat united till maturity; stigmas sessile. Fruit follicular or capsular; seeds anatropous; embryo straight; endosperm none.

647. *Scheuchzeria palustris* L. Arrow-grass. Reported from marshes of central Kansas; possibly the same as the next.

648. *Triglochin maritima* L. Salt-marsh Arrow-grass. Salt marshes in the sandy salt region of central Kansas; frequent. July. (AS)

Family 47. ALISMACEÆ. Arrow-head Family.

Annual or perennial scapose aquatic herbs, with roots fibrous or stoloniferous. Leaves various, basal, sheathing, ordinarily long-petioled, with broadly expanded, auriculate-lobed, cordate, ovate, or lanceolate, or even without expansion of the distal ends; sometimes reduced to stipular phyllodia; no dividing line can be drawn between the extreme forms. Inflorescence often in verticils of three, subtended by bracts. Flowers actinomorphic, pediceled; when monœcious the uppermost flowers are staminate, the lower carpellate or perfect. Perianth of three persistent green herbaceous sepals and three deciduous chromoplastic petals, imbricate in prefloration. Stamens six or more, distinct, in two whorls; anthers bisporangiate, extrorse, dehiscing by lateral vertical slits. Carpels numerous; ovaries superior, distinct, unilocular; ovules erect, campylotropous, solitary or several in each ovary. Fruit a head of turgid achenes; seeds uncinatè-curved, ribbed; embryo horseshoe-shaped; endosperm none.

649. *Alisma plantago* L. Water-plantain; *Alisma*. Mud and shallow water, in nearly every county; occasional. June. (ASU)

650. *Helianthium tenellum* Britt. (*Alisma* Martens.) Spear-head. Mud; occasional; not often recognized. April. (AS)

651. *Echinodorus cordifolius* Grisebach. (*Alisma* L.) Upright Bur-head. Waterholes and ditches, general; common. June. (ASU)
652. *Echinodorus radicans* Engelm. Creeping Bur-head. Cherokee to Montgomery county; not common. June. (AS)
653. *Lophotocarpus calycinus* J. G. Smith. (*Sagittaria* Eng.) Variable Lance-head. Water, throughout the state; common.
654. *Lophotocarpus depauperatus* Sm. Elliptic Lance-head. Borders of ponds, S. E. K.; rare. July. (A)
655. *Sagittaria platyphylla* Sm. Ovate-leafed Arrow-head. Sloughs and shallow water, S. E. K.; frequent. July. (ASU)
656. *Sagittaria graminea* Mx. Grass-leafed Arrow-head. Mud or shallow water, S. E. K.; not common. July. (SU)
657. *Sagittaria heterophylla* Pursh. Variable Arrow-head. Muddy places, S. E. K.; frequent. July. (ASU)
658. *Sagittaria ambigua* Sm. Kansas Arrow-head. Borders of ponds, S. E. K., west to Meade county; frequent. July. (ASU)
659. *Sagittaria longiloba* Eng. Long-eared Arrow-head. Shallow water, W. K.; occasional. July. (AS)
660. *Sagittaria brevirostra* Mack. & B. Short-beaked Arrow-head. Sloughs and wet bottoms, Johnson county (Mackenzie & Bush). July.
661. *Sagittaria arifolia* Nutt. (*S. cuneata* Sheld.) Arum-leafed Arrow-head. Shallow water, or deeper, C. and W. K.; occasional. August. (S) Developing laminodia or phyllodia, or both, according to circumstances.
662. *Sagittaria latifolia* Willd. Broad-leafed Arrow-head. Shallow spring water, throughout the state; common. July. (ASU)

ORDER XXIV. COMMELINALES. THE DAYFLOWERS.

Inflorescence in verticils, cymes, spikes, spadices, or solitary, subtended by spathe-like or leaf-like bracts. Perianth of six divisions, heterochlamydeous, zygomorphous, partially two-lipped, occasionally the lower lip consisting of a single specialized petal. Androecium of stamens. Six partly fertile and partly barren, or three, peculiarly arranged and partly unlike, as though they were portions of two whorls with certain units entirely suppressed, the whole in a tube separate from the gynoecium. Ovary superior; ovules anatropous; seeds one to many; embryo straight, cylindric, central, enantiomorphous (opposite the hilum), in a copious farinaceous endosperm. In this order there are many orchidifloral characteristics, though not always clearly evident.

Family 48. COMMELINACEÆ. Spiderwort Family.

Jointed herbs from thickened, fibrous roots, with showy flowers in umbel-like cymes subtended by one or more leaf-like or spathe-like bracts. Calyx of three persistent herbaceous green sepals and corolla of three deliquescent chromocyanic membranous petals, the lower or dorsal one in *Commelina* rudimentary. Anthesis periodical, morning opening only; flowers close about midday. Stamens six, rarely fewer, hypogynous, in two series, two or three fertile, three or four larger and sterile; fertile anthers bisporangiate, longitudinally dehiscent; sterile anthers larger and -)-(- shaped. Ovary sessile or nearly so, bilocular or trilocular; ovules

one to several in each loculus, anatropous, or nearly so; style simple; stigma two- to three-lobed. Capsule two- to three-valved; seeds reticulated.

663. *Tradescantia virginiana* L. Spiderwort; "Spider Lily." Common in rich, alluvial soil in valley lands; more frequent east than west; 4-8 dm. Flowers deep blue, purple, lilac, violet, crimson, rose color, white; floral parts often duplicated; even four sepals, four petals, eight stamens, and a four-parted gynœcium is not unusual; capable of improvement by cultivation. May. (ASU)

664. *Tradescantia occidentalis* (Britt.) Western Spiderwort. Dry soils, W. K.; 1-4 dm.; frequent in the damper soils of the semiarid region. Flowers violet, lilac, rose, or white, much the same as *T. virginiana* reduced. Leaves narrow, hairy; bracts narrow. Occasionally found growing side by side with *T. virginiana*, which it most resembles. May. (AS)

665. *Tradescantia bracteata* Small. Large-bracted Spiderwort. Sandy soil, on low prairies, E. K.; occasional. May. (ASU)

666. *Tradescantia reflexa* Raf. Reflexed Spiderwort. Drift hills and well-drained drift soil, N. E. K.; frequent. June. (ASU)

667. *Tradescantia brevicaulis* Raf. Low Spiderwort. Moist sandy soil, $\frac{1}{2}$ to $1\frac{1}{2}$ dm. high; flowers large, frequent. April. (AS)

668. *Commelina communis* L. Asiatic Dayflower. Rich alluvial banks, Wyandotte and Cherokee counties; rare. July. (A)

669. *Commelina virginica* L. Dayflower. Moist or damp alluvial soils, general throughout E. K., though not very common. June. (ASU)

670. *Commelina angustifolia* Mx. Sandhill Dayflower. Common in the sand hills south of the Arkansas river, and as far northeast as Ottawa county. Similar to *C. virginica*, but leaves narrow and plant adapted to a dry soil and climate. Third petal twisted up and very small. July. (ASU)

671. *Commelina crispa* Wooton. Curly-leaf Dayflower. Moist soil and sheltered alluvial banks, general; frequent to common. June. (ASU)

672. *Commelina hirtella* Vahl. Bearded Dayflower. Moist and sheltered situations, Miami county; rare. July. (U)

Family 49. PONTEDERIACEÆ. Pickerel-weed Family.

Perennial aquatic plants, from creeping or floating rootstocks, with laminodia having cordate-ovate, orbicular, reniform, or ovate campylo-drome-nerved prolaminae, or entirely linear or grass-like laminodia. Flowers zygomorphous, perfect, few or several. Perianth of three colored petals and three dissimilarly shaped sepals, all united below into a two-lipped tube free from the ovulary. Stamens six, trimorphous, inserted on the tube of the perianth; anthers linear-oblong, bisporangiate, versatile. Ovulary imperfectly trilocular, with axile placentæ, or unilocular by suppression of two of the carpels or reduction of the three parietal placentæ; style trimorphous; stigmas minutely three-toothed.

673. *Heteranthera dubia* Macmillan. Water Mud-plantain. Still water, W. K.; frequent in spots. Leaves linear, subaqueous. July. (A)

674. *Heteranthera limosa* Willd. Small Mud-plantain. Mud or shallow water, W. K.; frequent. Aug. (AS)

675. *Heteranthera reniformis* Ruiz & Pavon. Mud-plantain. Muddy ditches and shallow water, E. K.; frequent some seasons, and not at all other years, depending on the rainfall at the proper time. July. (SU)

676. *Piaropus crassipes* Britt. (*Eichhornia* Solms.) Water-hyacinth. Planted in little lakes here and there in E. K. and S. E. K., as at Merriam Park, Gage Park, etc. • Does not survive the winter. Leaves reniform.

677. *Pontederia cordata* L. Pickerel-weed. Borders of ponds, S. E. K.; not common. July. Leaves cordate-sagittate

ORDER XXV. NYMPHÆALES. THE WATER-LILIES.

Inflorescence solitary, at the ends of long scapes or peduncles. Flowers commonly floating, perfect; perianth normally six-parted, hypogynous. Stamens six to many, hypogynous, part of the many stamens barren and more or less transformed into petals (staminodia). Anthesis periodical, day opening. Pollination entomophilous, rarely hydrophilous. Carpels three or more, distinct or united; ovules solitary or several in each ovulary. Fruit nut-like, indehiscent, with one or more seeds. (This order has many dicotyl characters, such as partially net-veined leaves, numerous petals, radiate stigmas, etc., allying it to the *Ranales* and *Papaverales*; yet, notwithstanding this, the plants are, in structure, mainly monocotyledonous.

Family 50. NYMPHÆACEÆ. Water-lily Family.

(a) *Cabomboideæ*. Water-shield Subfamily.

Stems slender, a meter or so in length, branching, and with the peduncles, petioles and under surface of the leaves coated with gelatinous matter. Floating laminæ peltate; submerged leaves palmately dissected into numerous capillary segments. Flowers axillary, small, various colors. Petals and sepals each three. Stamens three to eighteen. Carpels three to eighteen, separate; ovules commonly three, pendulous. Fruit one- to three-seeded, indehiscent.

678. *Cabomba caroliniana* Gray. Carolina Water-shield; Parrot-feather. Ponds and slow streams, S. E. K.; occasional. May. (S)

679. *Brasenia purpurea* Caspary. (*B. peltata* Pursh.) Water-shield. Ponds and slow streams, Cherokee to Montgomery county; occasional. Summer.

680. *Brasenia schreberi* Gmelin. Water-target. Grown occasionally in the little artificial ponds, in company with water-lilies, on account of its peltate floating floral leaves.

(b) *Nymphæoidæ*. Pond-lily Subfamily.

Rootstocks perennial and very thick, creeping in the soft, black earth in the bottom of ponds, with the water preferably one to two meters deep. Leaves very large and floating; petioles as long as the depth of the water; laminæ flat on the surface, auriculate lobed, orbicular to lance-ovate, the basal lobes often touching, leaving a deep sinus at the base of the lamina; nervation radiating, pinnate, and dichotomous; submerged leaves similar, but with shorter petioles. Perianth of three sepals and three petals; petalodia and staminodia, or petal-like and neutral stamens, numerous; fertile stamens many, always in whorls of three. Carpels many, united into a compound globose fruit; styles none; stigmas as many as the carpels, linear, radiating, poppy-like, on a disk on the upper surface of the ovaries. Seeds ovoid-globose, stipitate or sessile; embryo central; endosperm moderate.

681. *Nymphaea advena* Aiton. (*Nuphar* R. Br.) Large Yellow Pond-lily. Ponds and slow streams, E. K.; occasional. Summer.

682. *Castalia odorata* Woodv. & Wood. Sweet-scented (white) Water-lily. Spreading slowly from various points in E. K., where introduced. Not abundant anywhere. July. Flowers open at 6 A. M.; close regularly at 4 P. M.

683. *Castalia elegans* (Hooker). Blue Water-lily. Occasional in park ponds with *C. odorata*; native in western Texas and New Mexico.

684. *Castalia rosea* Pursh. Rose-colored Water-lily. In Chautauqua Park pond at Ottawa before the recent flood on the Marais des Cygnes, in company with *Castalia odorata* and *elegans*; though no effort had then been made to plant the tubers so as to have them bloom in the form of an American flag.

685. *Victoria regia* Lindl. Royal Water-lily; Victoria. In Gage Park, Topeka, and probably elsewhere. Leaves with an upturned rim.

(c) *Nelumboideæ*. Water-lotus Subfamily.

Rootstocks very thick, horizontal, in muck under water a meter or more in depth. Leaves basal, with long petioles, and large peltate orbicular slightly concave laminae, floating or emersed. Flowers large, solitary, floating, on the end of long scapes. Perianth ample; outer whorl 3 to 6, more or less green; petals, petalodia and staminodia many, in numerous whorls, caducous; fertile stamens indefinite, in many whorls. Carpels numerous, distinct, immersed separately in the broad flat surface of the very large, fleshy receptacle; ovules one or two, pendulous or anatropous, one to mature. Seeds ovoid-globular, with a small neck above, formed by the short, persistent style; embryo nearly central, large, without endosperm.

686. *Nelumbo lutea* Pers. Yellow Water-lotus; Water-chinkapin. Ponds, E. K.; occasional, sometimes in great abundance, filling a pond to the exclusion of everything else. July. Flowers unfold at five A. M.; close at two P. M.

Subclass D. LILIIFLORÆ. Hexaphyls.

LILY-FLOWERED MONOCOTYLS.

Perianth hexaphyllous, mostly actinomorphic, homochlamydeous, the two whorls (calyx and corolla) so close together as to be almost or quite in one, the segments nearly equal in size, form, and color, seldom unlike, more or less united at base, sometimes quite tubular. Andræcium hexandrous, the stamens alternating in two whorls so close together as to appear almost, and often are quite, in one; seldom less than six, never more without chorisis. Pollination entomophilous. Gynæcium a three-valved capsule, many-seeded, or a trilocular berry.

ORDER XXVI. LILIALES. THE LILIADS.

Inflorescence various. Flowers polysymmetrical, the perianth hypogynous or perigynous, the stamens hypogynous or epipetalous. Ovary trilocular, the ovules numerous in each loculus. Fruit capsular, rarely baccate. Seeds various; embryo small, in copious albumen.

Family 51. MELANTHACEÆ. Bunch-flower Family.

Leafy-stemmed herbs, with perennial rootstocks or bulbs. Inflorescence paniced or racemose, rarely solitary. Flowers perfect, polygamous, or diœcious. Perianth of six nearly separate persistent segments. Stamens

six, on the bases of the perianth-segments. Anthers with two sporanges, or confluent with one double, oblong or ovate, cordate or reniform, versatile, and extrorsely dehiscent. Ovulary trilocular, superior or partly inferior; ovules few or numerous, anatropous or amphitropous; styles separate. Capsule with septicidal dehiscence, rarely loculicidal. Seeds appendaged.

687. *Colchicum autumnale* L. Meadow Saffron. Occasional in gardens.

688. *Chamælorium luteum* Gray. (*Ch. caroliniana* Willd.) Blazing-star. Moist meadows, Miami county; not common. May. (U)

689. *Zygadenus nuttalli* Wats. Western Zygadene. Dry hills, W. K., as far east as Morris county; not common except where it occurs. May-June. (ASU)

690. *Melanthium virginicum* L. Bunch-flower; Melanth. Meadows, E. K.; rare. June. (U)

691. *Uvularia grandiflora* J. E. Smith. Large-flowered Bellwort. Rich, moist woods, extreme E. and S. E. K.; infrequent. May. (AU)

692. *Uvularia sessilifolia* L. Bellwort. Moist woods, Wyandotte county; rare. May. (U)

Family 52. LILIACEÆ. Lily Family.

Scapose or leafy-stemmed herbs, from bulbs, corms, or rootstocks. Inflorescence solitary, spicate, racemed, paniced, or umbel, in different genera. Flowers perfect. Perianth-segments distinct, or more or less united into a tube. Stamens inserted on the throat of the perianth or at the base of the segments; anthers versatile, introrse, or extrorse, rarely declinate. Ovules anatropous or amphitropous; styles united; stigmas capitate or three-lobed. Fruit a loculicidal capsule or an indehiscent berry. Seeds winged or wingless.

693. *Hemerocallis fulva* L. Coppery Day-lily. Spreads from cultivation but very little; yet persists where planted for a long series of years.

694. *Hemerocallis flava* L. Yellow Day-lily. Often seen near houses after having been planted there many years before.

695. *Funkia subcordata* Sprengel. White Day-lily. With long, tubular, funnel-form flowers. Persists, like the other day-lilies, where planted.

696. *Funkia ovata* Spreng. Blue Day-lily. With nodding violet flowers abruptly expanded above the narrow tube. More tender than the others.

697. *Agapanthus umbellatus* L'Heritier. Love-flower; African Lily. Frequent in the best gardens and window pots. With a handsome umbel of large blue flowers.

698. *Allium vineale* L. Field Garlic. A pest in some wheat fields in E. K.; introduced in seed wheat from the east.

699. *Allium cepa* L. Onion. Seldom gets beyond cultivation. Some winter varieties occasionally persist for a few years.

700. *Allium canadense* L. Top-bulb Wild-onion. Meadows, general; frequent. May. (ASU)

701. *Allium cernuum* Roth. Nodding Wild-onion. Hillsides, near the Neosho river, also in Cowley county; occasional. July. (ASU)

702. *Allium stellatum* Ker. Prairie Wild-onion. Rocky banks and dry prairies, general; frequent. July. (ASU) Perianth pink-striped.

703. *Allium mutabile* Mx. Pink Wild-onion. Moist soil, general; common. April. (ASU)

704. *Allium nuttallii* Wats. Roseate Wild-onion. Prairies, general; common. April. (ASU)

705 *Allium helleri* Small. Twin Wild-onion. Dry soil. April-May. Credited to Kansas by Britton's Manual.

706. *Allium reticulatum* Don. Netted Wild-onion. Damp prairies, C. and W. K.; common. May. (ASU)

707. *Nothoscordum bivalve* Britt. Mild-onion; Pixie-cup. Prairies, W. K.; common. March. (ASU)

708. *Androstephium cæruleum* Green. Blue Elfin-crown. Prairies, Mor-ton county; occasional. April. (U)

709. *Lilium umbellatum* Psh. Western Red Wood-lily. Dry wooded hills from Valley Falls northeastward; occasional. June. (SU)

710. *Lilium canadense* L. Yellow Wood-lily. Woods and fields, N. E. and S. E. K.; rare. June. (AU)

711. *Lilium tigrinum* Andrews. Tiger Lily. Several varieties. Oc-casionally escapes from gardens by means its axillary bulblets.

712-716. *Lilium martagon* L. (Turk's-cap Lily), *speciosum* Thunb., *japon-icum* Thunb., *longiflorum* Thunb., *candidum* L. (Madonna Lily), and other exotic lilies are in cultivation.

717. *Fritillaria imperialis* L. Crown-imperial Fritillary. Flowers large, orange-yellow or scarlet, hanging in an umbel under the terminal crown.

718. *Erythronium dens-canis* L. Dog-tooth Adder-tongue. Cultivated.

719. *Erythronium albidum* Nutt. White Adder-tongue. Moist woods, E. K.; common. Leaves white mottled. April. (ASU)

720. *Erythronium mesachoreum* Knerr. Midland Adder-tongue. Dry hills and prairies, E. K.; common. Leaves narrow, green. March. (ASU)

721-722. *Tulipa gesneriana*, *suaveolens*, and other species of tulip are in cultivation quite commonly.

723. *Camassia esculenta* Robinson. (*C. fraseri* Torr.) Wild-hyacinth. Dry ground near streams. Franklin county and eastward; 6-10 dm. high; frequent. April-May. (ASU)

724. *Hyacinthus amethystinus* L., etc., often in open gardens.

725-726. *Ornithogalum umbellatum* and *nutans* L. Star-of-Bethlehem. Frequent in gardens; seldom tries to escape.

727. *Muscari botryoides* Mill. Grape-hyacinth. Frequent in gardens; occasionally escapes into lawns and fields.

728-729. *Kniphofia aloides* Moench, *tuckii* Baker, etc. Red-hot-poker; Flame-flower; Zulu Boyonet. Frequent in gardens; leaves have sharp keels and edges.

730. *Dracæna fragrans* Ker-Gawl. Dragon-tree. A pot-plant in houses.

731-732. *Sansevieria glauca*, *zeylanica* Willd., etc. Zebra-leaf. Frequent in pot cultivation.

733. *Yucca glauca* Nut. (*Y. angustifolia* Pursh.; *Y. constricta* Buckl.) Yucca; Bear-grass; Spanish Bayonet. Dry hills, W. K., as far east as Sedgwick, Riley and Clay counties; common. May. (ASU)

734. *Yucca filamentosa* L. Yucca; Adam's Needle. Common in gar-dens.

Family 52b. CONVALLARIACEÆ. Lily-of-the-Valley Family.

Scapose or leafy-stemmed herbs, from simple or branched rootstocks, never from bulbs or corms. Inflorescence solitary, racemed, paniced, or

umbeled. Leaves (laminodia) usually alternate, sometimes verticillate, and again reduced to evanescent scales. *Asparagus* has under each dry scale a cluster of minute green branchlets which serve as prophylla. Perianth-segments united at the base and six-parted, urceolate and six-lobed, or cylindric and six-toothed. Stamens borne on the perianth-segments or at the base of the carpel. Ovules anatropous or amphitropous; stigma three-lobed; fruit a fleshy berry.

735. *Asparagus officinalis* L. *Asparagus*. Frequently escapes into the woods and thickets for a number of years. Lasts longer on salty soil.

736-7. *Asparagus plumosus*, *sprengeri*, etc. Cultivated on account of their green prophylla, or minute branchlets, which answer the purpose of foliage and keep green long without wilting, when in a bouquet.

738. *Smilacina racemosa* Desfontaines. (*Vagnera* Morong.) Wild-spikenard. Moist thickets, near streams, E. K.; frequent. May. (ASU)

739. *Smilacina stellata* Desf. Blue-flowered Wild-spikenard. Moist soil, near water, W. K., to Salina and Hutchinson; frequent. May. (ASU)

740. *Streptopus amplexifolius* D. C. Clasp-leaf Twist-foot. Moist woods, Montgomery county; occasional. May. (U)

741. *Polygonatum biflorum* Elliott. Two-flowered Solomon-seal. Thickets, general; common. May. (ASU)

742. *Polygonatum commutatum* Dietr. Great Solomon-seal. Thickets and river banks; general over the state; common. June. (ASU)

743. *Convallaria majalis* L. Lily-of-the-valley. Has slight tendency to escape from gardens.

744. *Trillium viride* Beckw. Kansas Trillium. Rich woods and open hillsides, Miami and Johnson counties, perhaps elsewhere; not common. May. (U) Petals light green or purplish green; filaments flat.

745. *Trillium viridescens* Nutt. Narrow-leaf Trillium. Hillsides and rich woods, E. K. (Britton's Manual, 1907.) Petals very narrow.

ORDER XXVII. SMILACALES. THE GREENBRIERS AND YAMS.

Inflorescence in umbels, racemes, or panicles; flowers small, greenish, monœcious or diœcious. Perianth-segments six, alike, deciduous or persistent. Andrœcium normally of six stamens, sometimes of three stamens and three staminodia. Gynœcium an inferior trilocular ovulary, with or without wings. Plants exogenous, with many dicotyl characters, such as net-veined laminæ articulated with the petiole, stomata transversely intercellular on the under surface of the laminæ, and petiole articulated with the vine. Yet they have but one cotyledon and the flowers are liliaceous.

Family 53. SMILACACEÆ. Greenbrier Family.

Thorny, woody vines, climbing by stipular tendrils from woody root-stocks. Inflorescence in globular axillary umbels, of very many small hexaphyllous hexandrous flowers. Perianth-segments distinct. Stamens distinct; filaments ligulate; anthers basifixed, introrse. Ovulary trilocular, the loculi opposite the inner perianth-segments; ovules one or two in each loculus, orthotropous. Fruit a globose berry, containing one to six brownish seeds; endosperm horny, copious; embryo small, remote from the hilum.

746. *Smilax herbacea* L. Carrion-flower. Thickets, E. K.; occasional, not common. May. (ASU) Has no bad odor.

747. *Smilax glauca* Walt. Smooth-leaf Greenbrier. Dry soil in thickets, E. K.; frequent. May. (ASU)

748. *Smilax rotundifolia* L. Greenbrier. Woods and thickets, general over the state; common. May. (ASU)

749. *Smilax hispida* Muhl. Thorniest Greenbrier. Thickets, E. K.; occasional. April. (ASU)

750. *Smilax pseudochina* L. Thornless Greenbrier; China-root. Sandy soil, low grounds, E. K.; frequent. Armed at base when old. April. (ASU)

751. *Smilax bona-nox* L. Bristly-leaf Smilax; Bamboo-brier. Thickets and low grounds, E. K.; frequent. May.

Family 54. DIOSCOREACEÆ. Yam Family.

Smooth, slender, twining vines, from fleshy or woody rootstocks. Leaves with petioles and laminae cordate to halberdoid, campylodrome-nerved and reticulate-veined; petioles articulating with the vine as in dicotyls. Inflorescence in racemes or panicles; flowers small, unisexual. Perianth six-parted, segments all alike; in the carpellate flowers persistent, united at the base and adherent to the ovulary. Staminate flowers with six or three fertile stamens, sometimes with a rudimentary ovulary. Carpellate flowers with an inferior trilocular ovulary; styles and stigmas distinct, sometimes with three or six staminodia. Ovules two in each loculus. Fruit a three-valved, three-angled, or three-winged capsule. Endosperm of the seed fleshy or cartilaginous; embryo small.

752. *Dioscorea paniculata* Mx. (*D. villosa* L.) Wild Yam-root. Moist woods and thickets in valleys of S. E. K.; frequent. June. (S) Medicinal.

753. *Dioscorea divaricata* Blanco. Cinnamon-vine. With a disposition to grow naturally from the little self-shed tuberlets on the vines, whenever they have fallen where they escape the severe frosts of winter. The growing tubers need but slight protection from frost; each successive year sends them deeper into the ground and increases the liability to escape winter-killing.

Subclass E. ORCHIDIFLORÆ. Heterophyls.

ORCHIS-FLOWERED MONOCOTYLS.

Perianth hexaphyllous, zygomorphous, rarely actinomorphous, the calyx and corolla often differing widely in form, color, texture, and purpose, monosymmetrical, more or less two-lipped, the various segments, unless they balance by being horizontally opposite, differing individually in some respect. Andræcium seldom of six fertile stamens, but usually of one or more fertile stamens and enough staminodia to make the complement six or three. Pollination almost exclusively entomophilous. Gynæcium normally tricarpellate, but usually unilocular by suppression of two of the carpels or by reduction of the three parietal walls.

ORDER XXVIII. IRIDALES. THE IRIDS.

Inflorescence in umbels or umbellate clusters subtended by membranous bracts. Perianth heterophyllous, actinomorphous or zygomorphous; segments distinct or united at base and coherent with the ovulary. Andræcium hexandrous, or of three stamens with or without three staminodia. Gynæcium an inferior trilocular capsule, many-seeded.

Family 55. AMARYLLIDACEÆ. Amaryllis Family.

Scapose or leafy-stemmed perennial herbs, from bulbs or rootstocks, and with soft, linear laminodia, rarely broadly expanded toward the distal end, and with rounded carinæ. Flowers perfect, nearly actinomorphic. Perianth six-lobed, the segments united below into a tube coherent with the ovulary. Stamens six, on the bases of the perianth-segments, often declinate; anthers versatile or basifixed, introrse, bisporangiate, longitudinally dehiscent. Ovulary inferior, trilocular; style filiform; stigmas three; ovules numerous, anatropous; fruit capsular; seeds black.

754. *Hymenocallis occidentalis* Kth. *Hymenocallis*. Marshy banks of streams, S. E. K.; not common. Aug.

755. *Narcissus jonquilla* L. *Jonquil*. Gardens; frequent.

756. *Narcissus pseudo-narcissus* L. *Daffodil*; *Trumpet-daffodil*. Common in residences.

757. *Narcissus tazetta* L. *Polyanthus Narcissus*. Common in houses.

758. *Narcissus poeticus* L. *Poet's Narcissus*. Houses and gardens.

759. *Zephyranthes atamasco* Herb. *Atamasco Lily*. Houses, frequent

760. *Zephyranthes rosea* Lindley. *Fairy Lily*. Frequent in windows.

761. *Sprekelia formosissima* Herb. *Jacobea Lily*. Houses, occasional.

762. *Amaryllis lateritia* Diet. *Amaryllis*. Many species of *amaryllis* are raised in homes, sometimes in gardens.

763. *Leucojum vernum* L. *Spring Snowflake*. A favorite in gardens.

764. *Leucojum autumnale* L. *Fall Snowflake*. Occasional in gardens.

765. *Cooperia drummondii* Herb. *Prairie-lily*; *Rain-lily*. Prairies S. E. K.; occasional, May. (AS)

766. *Hypoxis hirsuta* Cov. *Hairy Star-grass*. Dry soil, E. K.; not common. June. (A)

767. *Galanthus nivalis* L. *Snowdrop*. Frequent in gardens. March-April.

768. *Polianthes tuberosa* L. *Tuberose*. Gardens; common. Summer.

769. *Agave americana* L. *Century-plant*. Common in residences and on lawns in summer. Several other species of *Agave* in house culture.

Family 56. IRIDACEÆ. Iris Family.

Herbs, from perennial rootstocks or bulbs, having linear two-ranked equitant laminodia, so folded as to appear laterally compressed, but without a deep keel. Flowers clustered, perfect, actinomorphic or zygomorphic. Perianth of six segments, in two series, the sepals and petals often markedly unlike, yet both showy, and convolute in prefloration. Stamens three, on the outer series of perianth-segments; anthers bisporangiate, extrorse; staminodia three, on the inner series of perianth segments. Ovulary inferior, trilocular; ovules numerous in each loculus, anatropous; style three-cleft, its branches flat, spreading, and petal-like, sometimes divided. Capsule three-valved, loculicidally dehiscent, or three-angled or three-lobed and many-seeded, rarely a berry after removal of the dry capsule.

770. *Iris versicolor* L. *Large Blue Flag*. Thickets, Leavenworth and Atchison counties; not common. May. Laminodia broad.

771. *Iris germanica* L. *Iris*; (*Fleur-de-lis*). Gardens; common in many varieties and horticultural subspecies.

772. *Iris pumila* L. *Dwarf Garden Iris*. Borders in gardens; common. April.

773. *Iris persica* L. Persian Iris. A choice house plant.
774. *Nemastylis acuta* Herb. (*N. geminiflora* Nutt.) Twin-star-flower. Prairies, S. E. K.; occasional. Perianth-segments similar. May. (A)
775. *Belamcanda chinensis* D. C. (*Pardanthus* Ker.) Blackberry-lily. Frequently escapes from gardens; yet not fully naturalized.
776. *Sisyrinchium campestre* Bickn. Prairie Blue-eyed-grass. Dry or damp sloping prairies, E. K.; common. June (ASU) Sometimes white.
777. *Sisyrinchium kansanum* (Bickn.) Kansas Blue-eyed-grass. Same situations; merely a form of the preceding.
778. *Sisyrinchium angustifolium* Mill. Blue-eyed-grass. Damp, sandy prairies, E. K.; frequent. May. (ASU) Violet and white varieties occur.
779. *Sisyrinchium gramineum* Curtis. (*S. anceps* Cav.) Winged Blue-eyed-grass. Damp woods and grassy meadows and slopes, E. K.; common. May. (ASU) White flowers are common; violet ones are rarer.
780. *Tigridia pavonia* Pers. Mexican Tiger-flower. Frequent in gardens.
- 781-783. *Gladiolus communis* L., *tuberosa* L., *ensifolius* Ker., and numerous other species are raised in gardens. Gladiolus; Corn-flag; Sword-flag.
784. *Crocus vernus* L., and other species, some of them for very early spring flowers in the grass, are grown in gardens.

ORDER XXIX. SCITAMINALES. THE DAINTIES.

Inflorescence in panicles, racemes, spikes, or solitary. Flowers perfect or polygamous, zygomorphous. Perianth in two series of three each, the petals differing from the sepals, and all united below into a tube coherent with the ovulary. Stamens one to five, with one to five staminodia. Ovulary unilocular to trilocular, inferior; ovules one in each loculus, anatropus. Embryo central, in copious albumen.

Family 57. MUSACEÆ. Banana Family.

Subtropical plants under cultivation, with leaves having distinct petiole and blade with pinnate nervation. Inflorescence in terminal drooping racemes. Perianth two-lipped, the lower lip three- to five-lobed and enclosing the upper smaller one. Stamens five fertile and one staminodium barren. Anthers bisporangiate. Fruit a berry.

785. *Musa sapientum* L. Banana. Occasionally cultivated in private gardens for its immense foliage. Never fruits outdoors here.

Family 58. MARANTACEÆ. Arrowroot Family.

Tall herbs, perennial by thick rootstocks or tubers, or annual with scapose or leafy stems. Inflorescence in terminal paniced spikes of heavily bracted flowers. Perianth superior, its segments distinct or united below into a tube. Fertile stamen one, with two double sporanges, one fertile, the other barren. Staminodia five, petal-like, separate or united by their bases and conforming to the requirements of a monosymmetrical flower. Ovulary unilocular, sometimes with two additional minute empty loculi. Base of staminodium-tube adnate to base of style or to the ovulary; stigma two-lipped. Fruit capsular or berry-like; seeds one in the one loculus.

786-787. *Maranta ornata* Linden. Ornate Arrowroot. In house cultivation, *M. zebrina* and other species are also found.

788-790. *Canna indica* Roscoe, *warszewiczii* Diet., *discolor*, and other species of canna are common in gardens.

ORDER XXX. ORCHIDALES. THE ORCHIDS.

Inflorescence in spikes, racemes, umbellate clusters, or solitary. Flowers zygomorphous, two-lipped. Perianth of six segments, heteromorphous, monosymmetric, in two series, the outer differing much from the inner; the two ventro-lateral sepals are similar, the dorsal one slightly smaller, and by a half-twist of the ovary brought erect; the two dorso-lateral petals are similar, the ventral one larger, and by the same twist brought downward; often spurred at the base, and sometimes so contracted or drawn at the margin as to form a sort of cup or sac (moccasin). Androecium of one or two fertile stamens and one, two or five staminodia, the whole united with the ovary and style into a zygomorphous gynandrous column. Pollination strictly entomophilous. Gynæcium an inferior tricarpellate unilocular ovary, usually twisted so as to reverse the normal position of the floral organs. Fruit a three-valved capsule; ovules innumerable; seeds minute.

Family 59. CYPRIPEDIACEÆ. Lady-slipper Family.

Stems quite leafy and pubescent. Laminodia broad, many-nerved, sheathing at the base. Perianth spreading; sepals separate, or two of them united under the lip. Ventral petal (the lip) a large inflated sac opening upward; dorso-lateral petals very long and slender, simulating fancy shoe-laces. Fertile stamens two (the dorso-lateral ones of the inner whorl), sessile on each side of the style; anthers with two double sporanges each; barren stamen one (the dorsal one of the outer whorl), forming a dilated fleshy appendage above the stigma. Pollinia granular, not waxy. Stigma terminal, broad, rough.

791. *Cypripedium parviflorum* Salisbury. Small Yellow Lady-slipper. Woods and thickets, E. K., west to eastern edge of Shawnee county; rare. May-June. (ASU)

Family 60. ORCHIDACEÆ. Orchis Family.

Perennial terrestrial herbs, often bog-plants, never epiphytic in this latitude, from bulbs, corms, rootstocks, or tubers, with soft, broadly expanded, campylodrome-nerved, sheathing or clasping laminodia, sometimes reduced to mere scales with full sheaths. Perianth-segments differing decidedly, the odd outer segment upward usually much prolonged, and the odd inner segment downward, termed the lip, of some bizarre shape different from all the rest and specialized for a particular purpose. Stamen one, the dorsal one of the outer whorl, above; anther with two or four single or double sporanges; dehiscence opercular. Pollinia in two or four, rarely eight, masses, cohering by waxy threads, attached at the base to a viscid disk and liberated when the proper kind of insect visits the flower. Staminodia two, the dorso-lateral ones of the inner whorl, each one lying in an androclinium on either side of the stigmatic column. Dorsal carpel above barren and prolonged into a rostellum overhanging the lip; ventro-lateral carpels below fertile; stigmas viscid and receptive, and facing the lower petal in such a way as to remove the pollen brought from another flower on the head or body of its special insect, while the insect is engaged in taking nectar from the nectar-cup. After this operation the insect receives a charge of pollen from the anther over its back. The nectar in the cup or calice is

the insect's reward for service performed, namely: pollination of the flower, which could scarcely be effected otherwise; yet is absolutely essential to perpetuation of the species. In the economy of nature the service and the reward are equal.

792. *Pogonia ophioglossoides* Ker. Snake-mouth. Damp meadows, E. K.; occasional. June.

793. *Triphora trianthophora* Rydberg. Nodding Beard-lip. Rich woods, E. K.

794. *Spiranthes cernua* Rich. Nodding Lady-tresses. Meadows, Kaw valley west to Ellsworth, and from Kinsley down in the Arkansas valley. July. (ASU)

795. *Spiranthes vernalis* Engelm. & Gray. Spring Lady-tresses. Grassy meadows, E. K., west to Council Grove; not common. July. (S)

796. *Spiranthes gracilis* Beck. Slender Lady-tresses. Dry woods, extreme E. K.; occasional. August.

797. *Blephariglottis leucophæa* Rydb. Prairie Fringed-orchis. Moist prairies, E. K.; frequent. June. (ASU)

798. *Oncidium tigrinum* La Llave and Lex. Tiger Orchis. Occasional in the best houses.

799. *Cattleya mendellii* (Hort.) Mendell's Cattleya. Occasional in private houses.

800. *Orchis spectabilis* L. Showy Orchis. Rich, shady woods, Doniphan to Wyandotte county, along the Missouri river; rare. May. (AU)